E

EACK *See:* extended acknowledgment.

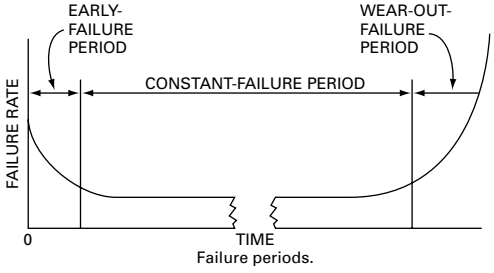
E&M signaling (telephone switching systems) A technique for transferring information between a trunk circuit and a separate signaling circuit over leads designated "E" and "M." The "M" lead transmits to the signaling circuit and the "E" lead transmits to the trunk circuit. (COM) 312-1977w

EAM *See:* electrical accounting machine.

eardrum reference point (DRP) A point located at the end of the ear canal, corresponding to the eardrum position. (COM/TA) 1206-1994

early decay time (EDT) Reverberation time based on the first 10 dB of sound decay in a room. (COM/TA) 1329-1999

early-failure period That possible early period, beginning at a stated time and during which the failure rate decreases rapidly in comparison with that of subsequent period. *See also:* constant failure rate period.



early failure period

(R) [29]

(2) (software) The period of time in the life cycle of a system or component during which hardware failures occur at a decreasing rate as problems are detected and repaired. *Synonym:* burn-in period. *Contrast:* wearout-failure period; constant-failure period. *See also:* bathtub curve. (C) 610.12-1990

early mode The very first edge that propagates through a given cone of logic. (C/DA) 1481-1999

early relay contacts Sometimes used for relay contacts, preliminary. (EEC/REE) [87]

early-warning radar Radar employed to search for distant enemy aircraft or missiles. (AES) 686-1997

ear mold A receiver-to-ear coupling device consisting of a short length of tubing (sound-pipe) and a fitting, usually made of hard plastic. The fitting is custom molded to an individual's concha and ear canal entrance. It occludes that portion of the ear canal into which the fitting extends. (COM/TA) 1206-1994

EAROM *See:* electrically alterable read-only memory.

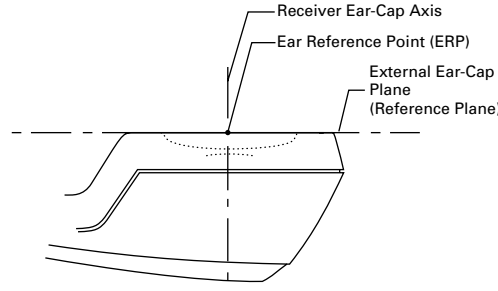
earphone (receiver) An electroacoustic transducer intended to be closely coupled acoustically to the ear. *Note:* The term receiver should be avoided when there is risk of ambiguity. (SP) [32]

earphone coupler A cavity of predetermined size and shape that is used for the testing of earphones. The coupler is provided with a microphone for the measurement of pressures developed in the cavity. *Note:* Couplers generally have a volume of six cubic centimeters for testing regular earphones and a volume of two cubic centimeters for testing insert earphones. (SP) [32]

ear reference point (ERP) (1) A point on the artificial test head where the intersection of the receiver ear-cap axis with the external ear-cap plane is placed for testing. (COM/TA) 269-1992

(2) A virtual point for geometric reference located at the entrance to the listener's ear, traditionally used for calculating telephonometric loudness ratings. (COM/TA) 1206-1994, 1329-1999

(3) The intersection of the receiver ear-cap axis with the external ear-cap plane (planar area containing points of the receiver-end of the handset which, in normal handset use which, in normal handset use, rest against the ear) as shown below.



ear reference point

(COM/TA) 1027-1996

earth, effective radius (radio-wave propagation) A value for the radius of the earth that is used in place of the geometrical radius to correct approximately for atmospheric refraction when the index of refraction in the atmosphere changes linearly with height. *Note:* Under conditions of standard refraction the effective radius of the earth is 8.5×10^6 meters, or 4/3 the geometrical radius. *See also:* radio-wave propagation; radiation. (AP/PROP) [36]

earth-fault protection *See:* ground protection.

earth inductor *See:* generating magnetometer.

earth rate The angular velocity of the earth with respect to inertial space. Its magnitude is $7.292 \cdot 10^{-5}$ rad/s (15.041°/h). This vector quantity is usually expressed as two components in local level coordinates, north (or horizontal) and up (or vertical). (AES/GYAC) 528-1994

earth resistivity The measure of the electrical impedance of a unit volume of soil. The commonly used unit is the ohm-meter (Ω-m) that refers to the impedance measured between opposite faces of a cubic meter of soil. (PE/PSC) 367-1996

earth's rate correction (1) (navigation aid terms) A rate applied to a gyroscope to compensate for the apparent precession of the spin axis caused by the rotation of the earth. (GCS) 172-1983w

(2) (gyros) A command rate applied to a gyro to compensate for the rotation of the earth with respect to the gyro input axis. (AES/GYAC) 528-1994

earth, remote *See:* remote earth.

earth station (communication satellite) A ground station designed to transmit to and receive transmission from communication satellites. (COM) [24]

earth terminal *See:* ground terminal.

earth wire *See:* overhead ground wire.

ear tip A receiver-to-ear coupling device consisting of a short length of tubing (sound-pipe) and a soft bulb-shaped fitting. It occludes that portion of the ear canal into which the ear tip extends. (COM/TA) 1206-1994

Easytrieve A database manipulation language used for extracting data from data files and databases. (C) 610.13-1993w

EBCDIC *See:* extended binary coded decimal interchange code.

E bend (E-plane bend) (waveguide technique) A smooth change in the direction of the axis of a waveguide, throughout which the axis remains in a plane parallel to the direction of polarization. *See also:* waveguide. (PE/EEC) [119]

EBR *See:* electron beam recording.

ECAP II *See:* Electronic Circuit Analysis Program II.

ECC *See:* error-correcting code; error-correction coding.

eccentric groove (disc recording) (eccentric circle) A locked groove whose center is other than that of the disc record (generally used in connection with mechanical control of phonographs). *See also:* phonograph pickup. (SP) [32]

eccentricity (1) (general) (power distribution, underground cables) The ratio of the difference between the minimum and average thickness to the average thickness of an annular element, expressed in percent. (PE) [4]

(2) (disc recording) The displacement of the center of the recording groove spiral, with respect to the record center hole. *See also:* phonograph pickup. (SP) [32]

Eccles-Jordan circuit A flip-flop circuit consisting of a two-stage resistance-coupled electron-tube amplifier with its output similarly coupled back to its input, the two conditions of permanent stability being provided by the alternate biasing of the two stages beyond cutoff. *See also:* trigger circuit. (EEC/PE) [119]

ECCM *See:* electronic counter-countermeasures.

electronic counter-countermeasures (ECCM) improvement factor (EIF) The power ratio of the electronic countermeasures (ECM) signal level required to produce a given output signal-to-interference ratio from a receiver using an ECCM technique to the ECM signal level producing the same output signal-to-interference ratio from the same receiver without the ECCM technique. *Notes:* 1. The principal application is the representation of the performance of certain ECCM techniques in the analysis of radar performance in hostile electromagnetic environments. 2. The EIF is not a measure of the overall efficacy of an ECCM technique. (AES) 686-1997

EDC *See:* error-detection coding.

echelon (calibration) A specific level of accuracy of calibration in a series of levels, the highest of which is represented by an accepted national standard. *Note:* There may be one or more auxiliary levels between two successive echelons. *See also:* measurement system. (IM) 285-1968w, 294-1969w, [38]

echo (1) (A) (supervisory control, data acquisition, and automatic control) A communication technique assuring that a word received at the termination point in a system is the same as the word originally transmitted. The received word is retransmitted to the sending device and matched to ensure that the original message was received properly. **(B) (software)** To return a transmitted signal to its source, often with a delay to indicate that the signal is a reflection rather than the original. **(C) (software)** A returned signal, as in definition (A). **(D) (data transmission) (general)** A wave which has been reflected or otherwise returned with sufficient magnitude and delay to be perceived in some manner as a wave distinct from that directly transmitted. *Note:* Echoes are frequently measured in decibels relative to the directly transmitted wave. **(E) (computer graphics)** The immediate notification of the current values provided by an input device to an operator at a display console; for example, by displaying the input value. (SWG/PE/SUB/C) C37.1-1987, 610.7-1995, C37.100-1992, 610.12-1990, 599-1985, 610.6-1991

(2) (facsimile) A wave that has been reflected at one or more points with sufficient magnitude and time difference to be perceived in some manner as a wave distinct from that of the main transmission. (COM) 168-1956w

(3) The second subaction packet. This 8-byte packet reports the status of the queueing of the corresponding send packet. (C/MM) 1596-1992

(4) In a communication channel, noise characterized by undesired return of the transmitted signal back to the sender after a delay interval corresponding to the round-trip transmission time, caused by improper echo suppression or impedance mismatch. (C) 610.7-1995

(5) The portion of energy of the radar signal that is reflected to a receiver. (AES) 686-1997

echo area, effective *See:* effective echo area.

echo attenuation (data transmission) In a four-wire or two-wire circuit in which the two directions of transmission can be separated from each other, the attenuation of the echo currents (which return to the input of the circuit under consideration) is determined by the ratio of the transmitted power to the echo power received expressed in decibels. (PE) 599-1985w

echo box A high-Q resonant cavity that stores part of the transmitted pulse power and feeds the resulting exponentially decaying power into the receiver after completion of the pulse transmission. (AES) 686-1997

echo canceler disabling tone A 1350 ms, 2100-Hz tone sequence, which includes two phase reversals. It is used to disable echo cancelers and echo suppressors. (COM/TA) 743-1995

echo check (1) A method of checking the accuracy of transmission of data in which the received data are returned to the sending end for comparison with the original data. (MIL) [2]

(2) (data management) A check in which information that has been transmitted is returned to the information source and compared with the original information to ensure accuracy of the transmission. *Synonym:* read-back check. (C) 610.5-1990w

(3) An error control technique in which the receiving terminal or computer returns the original message to the sender to verify that the message was received correctly. *See also:* echoplex. (C) 610.7-1995

echo checkback message A communication technique assuring that a message received at the termination point in a system is the same message as originally transmitted. The received message is retransmitted to the sending device and matched to ensure that the original message was received properly. (SUB/PE) C37.1-1994

echo path delay (EPD) (1) The time difference between an incident signal and the returned reflection of that incident signal. There can be multiple echo paths with different delays. (COM/TA) 743-1995

(2) The total delay of the echo path from the receive electrical test point to the send electrical test point, excluding any delay in the test equipment. (COM/TA) 1329-1999

echo path loss (EPL) The difference in dB between an incident signal and the returned reflection of that signal. There can be multiple echo paths with different losses. (COM/TA) 743-1995

echo path response The output at the send electrical test point due to an input at the receive electrical test point. It is a measure of acoustic, vibration, and electrical coupling from the receive circuit to the send circuit. (COM/TA) 1329-1999

echoplex An echo check applied to network terminals operating in duplex transmission to assure that data is received correctly at the other end. (C) 610.7-1995

echo radar (navigation aid terms) The portion of energy of the transmitted pulse which is reflected to a receiver. (AES/GCS) 172-1983w

echo ranging (navigation aid terms) The process of determination of distance by measuring the time interval between transmission of a radiant energy source, usually sound, and the return of its echo. *See also:* radio-acoustic ranging. (AES/GCS) 172-1983w

echo return loss (ERL) (1) The frequency weighted average of the return losses over the middle of the voice band, with the far end terminated with a specified impedance. The 3 dB down frequencies of the weighting are 560 Hz to 1965 Hz. *See also:* singing return loss. (COM/TA) 743-1995

(2) A frequency-weighted average, over the middle of the voice band, of the return losses RL(f) at any point in a channel, with the output of the channel terminated with a specified standard impedance. The weighting is given in IEEE Std 743-1984. The 3 dB bandwidth of the weighting is 560 Hz to 1965 Hz. (COM/TA) 1007-1991r

(3) *See also:* terminal coupling loss. (COM/TA) 1329-1999

echo, second-time-around *See:* second-time-around echo.

echo sounder (navigation aid terms) An instrument used for echo sounding. (AES/GCS) 172-1983w

echo sounding (navigation aid terms) Determination of the depth of water by measuring the time interval between emissions of a sonic or ultrasonic signal and the return of its echo from the bottom. (AES/GCS) 172-1983w

echo sounding system (depth finer) A system for determination of the depth of water under a ship's keel, based on the measurement of clapsed time between the propagation and projection through the water of a sonic or supersonic signal, and reception of the echo reflected from the bottom. (PE/EEC) [119]

echo suppressor (1) (navigation aid terms) (navigation) A circuit component that desensitizes the receiving equipment for a period after the reception of one pulse, for the purpose of rejecting pulses arriving later over indirect reflection paths. (AES/GCS) 172-1983w

(2) (data transmission) A voice-operated device for connection to a two-way telephone circuit to attenuate echo current in one direction caused by telephone current in the other direction. (PE) 599-1985w

ECL *See:* emitter-coupled logic.

eclipsing The loss of information on radar echoes at ranges when the receiver is blanked because of the occurrence of a transmitter pulse. Numerous such blankings can occur in radars having high pulse-repetition frequencies. *See also:* blind range. (AES) 686-1997

ECM *See:* electronic countermeasures.

ecology The interrelation between organisms and their environment or the division of biology concerned with the study of such relationships. (T&D/PE) 539-1990

Econometric Software Package (ESP) A programming language used for statistical analysis of time series and other data by regression and more sophisticated econometric techniques. Includes data editing, transformation and display, matrix manipulation, and a variety of complex forecasting procedures. (C) 610.13-1993w

economic dispatch (electric power system) The optimization of the incremental cost of delivered power by allocating generating requirements among the on-control units with consideration of such factors as incremental generating costs and incremental transmission losses. (PE/PSE) 94-1991w

economic dispatch control (ED) (electric power system) An automatic generation control subsystem designed to allocate unit generation to minimize the incremental cost of delivered power. (PE/PSE) 94-1991w

economy energy (power operations) Energy produced in one system and substituted for less economical energy in another system. *See also:* generating station. (PE/PSE) 858-1987s, 346-1973w

economy power Power produced from a more economical source in one system and substituted for less economical power in another system. *See also:* generating station. (T&D/PE) [10]

ECP *See:* engineering change proposal.

ECR *See:* electronic cash register.

ECSA *See:* Exchange Carriers' Standards Association.

ECSS II *See:* Extendible Computer System Simulator II.

ED *See:* economic dispatch control.

EDD *See:* envelope delay distortion.

eddy current(s) (1) (electrical heating systems) Current that circulates in a metallic material as a result of electromotive forces induced by a variation of magnetic flux. (IA/PC) 844-1991

(2) The currents that are induced in the body of a conducting mass by the time variation of magnetic flux. (PE/TR) C57.12.80-1978r

eddy-current braking (rotating machinery) A form of electric braking in which the energy to be dissipated is converted into heat by eddy currents produced in a metallic mass. *See also:* asynchronous machine. (PE) [9]

eddy-current loss (1) (parts, hybrids, and packaging) Power dissipated due to eddy currents. *Note:* The eddy-current loss of a magnetic device includes the eddy-current losses in the core, windings, case, and associated hardware. (CHM) [51]

(2) (power and distribution transformers) The energy loss resulting from the flow of eddy currents in a metallic material. (PE/TR) C57.12.80-1978r

edge (1) (image processing and pattern recognition) In image processing, a set of pixels belonging to an arc and having the property that pixels on opposite sides of the arc have differing gray levels. (C) 610.4-1990w

(2) A logic state transition that is considered instantaneous for a given pattern in the simulation process. (SCC20) 1445-1998

edge detection (image processing and pattern recognition) An image segmentation technique in which edge pixels are identified by examining their neighborhoods. *See also:* edge linking. (C) 610.4-1990w

edge diffraction Diffraction by a transverse obstacle with a relatively sharp profile, located between the transmission and reception points. Diffraction over a very sharp profile is frequently called knife-edge diffraction. (AP/PROP) 211-1997

edge enhancement (image processing and pattern recognition) An image enhancement technique in which edges are sharpened by increasing the contrast between the gray levels of the pixels on opposite sides of the edge. (C) 610.4-1990w

edge image An image in which each pixel is labeled as either an edge pixel or a non-edge pixel. (C) 610.4-1990w

edge linking An image processing technique in which neighboring pixels labeled as edge pixels are connected to form an edge. (C) 610.4-1990w

edge operator A neighborhood operator that determines which pixels in an image are edge pixels. (C) 610.4-1990w

edge pixel A pixel that lies on an edge. (C) 610.4-1990w

EDIF *See:* Electronic Design Interchange Format.

edge-coated card A punch card that has been strengthened by treating one or more of its edges with a special coating. (C) 610.10-1994w

edge-notched card A punch card into which notches representing data are punched around the edges. *See also:* edge-punched card. (C) 610.10-1994w

edge-punched card A punch card that is punched with hole patterns in tracks along the edges. *Synonym:* verge-punched card. (C) 610.10-1994w

edge sensitive Pertaining to a circuit that responds to a transition, usually in one direction, of an input signal; for example, responding to the rising edge of a signal. *Contrast:* level sensitive. (C) 610.10-1994w

edge-sensitive signal Signals whose leading and/or trailing edges are used to strobe information contained on level sensitive signals. (C/BA) 896.9-1994w

edge-sensitive storage element A storage element mapped to by a synthesis tool that

a) Propagates the value at the data input whenever an appropriate value is detected on a clock control input, and
b) Preserves the last value propagated at all other times, except when any asynchronous control inputs become active.

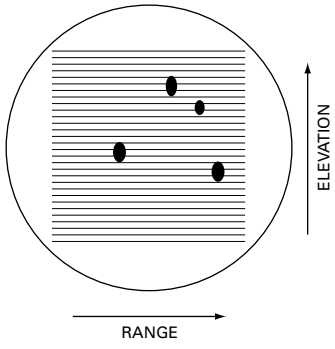
(For example, a flip-flop.) (C/DA) 1076.6-1999

Edison distribution system A three-wire direct-current system, usually about 120−240 volts, for combined light and power service from a single set of mains. *See also:* direct-current distribution. (T&D/PE) [10]

Edison effect *See:* thermionic emission.

Edison storage battery An alkaline storage battery in which the positive active material is nickel oxide and thenegative an iron alloy. *See also:* battery. (EEC/PE) [119]

E-display A rectangular display in which targets appear as intensity-modulated blips with range indicated by the horizontal coordinate and elevation angle by the vertical coordinate. *Note:* The term "E-display" has also been applied to a display in which height or altitude is the vertical coordinate. This usage is deprecated because of ambiguity. The preferred term for such a display is "range-height indicator (RHI)."



E-display

(AES) 686-1997

edit (1) (computers) To modify the form or format of data, for example, to insert or delete characters such as page numbers or decimal points. (MIL) [2]

(2) (software) To modify the form or format of computer code, data, or documentation; for example, to insert, rearrange, or delete characters. (C) 610.12-1990

editing symbol In micrographics, a symbol on microfilm that is human readable without magnification and that provides cutting, loading, or other preparation instructions. (C) 610.2-1987

editor *See:* linkage editor; text editor.

EDP *See:* electronic data processing.

EDR *See:* electrodermal reaction.

EEI *See:* external environment interface.

eel *See:* conductor cover.

EEPROM *See:* electronically erasable programmable read-only memory.

EEPROM redundancy *See:* redundancy.

effect A change in an organism or in a specific biological parameter as a result of application of some treatment (e.g., chemical). Also, a difference in some parameter between a control and treatment group that is biologically and/or statistically significant. (PE/T&D) 539-1990

effective address (1) (microprocessor assembly language) The result of evaluating an address in accordance with its addressing mode. (C/MM) 695-1985s

(2) (software) The address that results from performing any required indexing, indirect addressing, or other address modification on a specified address. *Note:* If the specified address requires no modification, it is also the effective address. *See also:* relative address; indirect address; generated address. (C) 610.12-1990, 610.10-1994w

(3) (computers) The address that is derived by applying any specified rules (such as rules relating to an index register or indirect address) to the specified address and that is actually used to identify the current operand. (C) [20]

effective aperture (1) (EM-radiation collection device) (radar) Synonymous with effective area for an antenna (IEEE Std 145-1973, Definitions of Terms for Antennas); also, the effective area of other EM-radiation collecting devices, such as lenses. (AES/RS) 686-1982s

(2) Normalized beamwidth of the SAW generated at center frequency and normalized to the corresponding wavelength. (UFFC) 1037-1992w

effective area (of an antenna) (in a given direction) In a given direction, the ratio of the available power at the terminals of a receiving antenna to the power flux density of a plane wave incident on the antenna from that direction, the wave being polarization matched to the antenna. *Notes:* 1. If the direction is not specified, the direction of maximum radiation intensity is implied. 2. The effective area of an antenna in a given direction is equal to the square of the operating wavelength times its gain in that direction divided by 4π. *See also:* polarization match. (AP/ANT) 145-1993

effective area antenna (data transmission) The ratio of the power available at the terminals of an antenna to the incident power density of a plane wave from that direction polarized, coincident with the polarization that the antenna would radiate. *See also:* antenna. (PE/AP/ANT) 599-1985w, [35]

effective area, partial *See:* partial effective area.

effective asymmetrical fault current (1) (safety in ac substation grounding) The root-mean-square (rms) value of asymmetrical current wave, integrated over the entire interval of fault duration. See corresponding figure. *Note:* It can be expressed as

$$I_F = D_f(t_f) I_f$$

where

I_F = effective asymmetrical current in A
I_f = (initial) symmetrical ground fault current in amperes
$D_f(t_f)$ = decrement factor accounting for the effect of a dc offset during the subtransient period of fault current wave on an equivalent time basis of the entire fault duration, t_f, for t_f given in s.2T

(2) The rms value of asymmetrical current wave, integrated over the interval of fault duration.

$$I_F = D_f \times I_f$$

where

I_F = the effective asymmetrical fault current in A
I_f = the rms symmetrical ground fault current in A
D_f = the decrement factor

(PE/SUB) 80-2000

effective band (facsimile) The frequency band of a facsimile signal wave equal in width to that between zero frequency and maximum keying frequency. *Note:* The frequency band occupied in the transmission medium will in general be greater than the effective band. (COM) 168-1956w

effective bandwidth (bandpass filter in a signal transmission system) The width of an assumed rectangular bandpass filter having the same transfer ratio at a reference frequency and passing the same mean square of a hypothetical current and voltage having even distribution of energy over all frequencies. *Note:* For a nonlinear system, the bandwidth at a specified input level. *See also:* signal; network analysis. (IE/AP/ANT) [43], 145-1983s

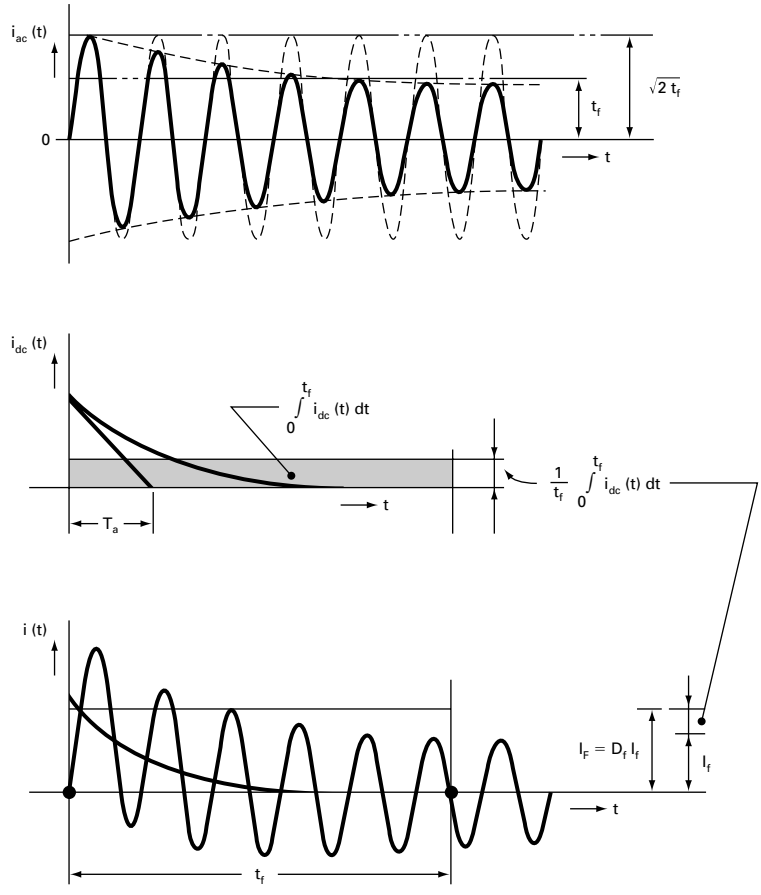
effective bunching angle (reflex klystrons) In a given drift space, the transit angle that would be required in a hypothetical drift space in which the potentials vary linearly over the same range as in the given space and in which the bunching action is the same as in the given space. (ED) 161-1971w

effective capacitance The imaginary part of a capacitive admittance divided by the angular frequency. (COM) [49]

effective ceiling cavity reflectance (illuminating engineering) A number giving the combined reflectance effect of the wall and ceiling reflectance of the ceiling cavity. *See also:* ceiling cavity ratio. (EEC/IE) [126]

effective center (radiation protection) The point within a detector that produces, for a given set of irradiation conditions, an instrument response equivalent to that which would be produced if the entire detector were located at the point. (NI) N42.17B-1989r, N323-1978r

effective center of mass (accelerometer) That point defined by the intersection of the pendulous axis and an axis parallel to the output axis about which angular acceleration results in minimum accelerometer output. *See also:* spin-offset coefficient. (AES/GYAC) 528-1984s



Relationship between actual values of fault current and values of I_F, I_f, and D_f for fault duration t_f

effective asymmetrical fault current

effective center-of-mass for angular acceleration (accelerometer) That point defined by the intersection of the pendulous axis and an axis parallel to the output axis, about which angular acceleration results in a minimum accelerometer output. (AES/GYAC) 528-1994

effective center-of-mass for angular velocity (accelerometer) (inertial sensors) That point defined by the intersection of the pendulous axis and an axis of constant speed rotation approximately parallel to the input axis, for which the offset due to spin becomes independent of orientation. *See also:* spin-offset coefficient. (AES/GYAC) 528-1994

effective cutoff frequency A frequency at which its insertion loss between specified terminating impedances exceeds by some specified amount the loss at some reference point in the transmission band. *Note:* The specified insertion loss is usually three decibels. *See also:* cutoff frequency; network analysis. (EEC/PE) [119]

effective dc inertia constant (H_{dc}) The rotational ac system inertia constant H converted to the base of dc power. (PE/T&D) 1204-1997

effective dielectric constant A parameter frequently used to characterize the phase velocity of modes propagating on planar transmission lines with inhomogeneous or anisotropic media. It is the square of the ratio of actual to free space propagation constant of a mode. It is the dielectric constant of an equivalent line filled by a nonmagnetic, homogeneous, isotropic medium in which a TEM wave propagates with the same phase velocity. (MTT) 1004-1987w

effective echo area (radar) The area of a fictitious perfect electromagnetic reflector that would reflect the same amount of energy back to the radar as the target. *See also:* navigation. (AES) [42]

effective echoing area *See:* radar cross section.

effective efficiency (1) (bolometer units) The ratio of the substitution power to the total RF power dissipated within the bolometer unit. *Notes:* 1. Effective efficiency includes the combined effect of the direct-current-radio-frequency substitution error and bolometer unit efficiency. *See also:* bolometric power meter. (IM) 470-1972w, [38]

(2) (electrothermic unit) The ratio of the substituted reference power (direct current, audio or radio frequency) in the electrothermic unit to the power dissipated within the electrothermic unit for the same direct current output voltage from the electrothermic unit at a prescribed frequency, poer level, and temperature. *Notes:* 1. Calibration factor and effective efficiency are related as follows:

$$\frac{K_b}{\eta_c} = 1 - |\Gamma|^2$$

where K_b, η_c and Γ are the calibration factor, effective efficiency, and reflection coefficient of the electrothermic unit, respectively. 2. The reference frequency is to be supplied with the calibration factor. (IM) 544-1975w

effective energy (radiation survey instruments) The energy of monochromatic photons which undergoes the same percentage attenuation in a specified filter as the heterogeneous beam under consideration. Aluminum is the filter specified for photon energies less than, or equal to, 100 kiloelectronvolts (keV), copper for photon energies between 100 keV and 1.5 megaelectronvolts (MeV), and lead for photons with energies greater than 1.5 MeV. (NI) N13.4-1971w

effective field *See:* rms field.

effective floor cavity reflectance, rfc (illuminating engineering) A number giving the combined reflectance effect of the floor cavity. *See also:* floor cavity ratio. (EEC/IE) [126]

effective flux penetration (electrical heating systems) The distance into a pipeline or a vessel wall that the value of current induced by the magnetic field at the surface would have to penetrate in order to generate the same heat as generated by the actual induced current distribution in the wall. (IA/PC) 844-1991

effective group ID (1) An attribute of a process that is used in determining various permissions, including file access permissions. This value is subject to change during the process lifetime. *See also:* group ID. (C/PA) 9945-1-1996, 9945-2-1993

(2) An attribute of a process that is used in determining various permissions. This value is subject to change during the process lifetime. *See also:* group ID. (C) 1003.5-1999

effective height (A) *High-frequency usage.* The height of the antenna center of radiation above the ground level. *Note:* For an antenna with symmetrical current distribution, the center of radiation is the center of distribution. For an antenna with asymmetrical current distribution, the center of radiation is the center of current moments when viewed from directions near the direction of maximum radiation. **(B) (data transmission)** The effective height of an antenna is the height of its center of radiation above the effective ground level. **(C) (data transmission)** In low-frequency applications the term effective height is applied to loaded or nonloaded vertical antennas and is equal to the moment of the current distribution in the vertical section, divided by the input current. *Note:* For an antenna with symmetrical current distribution, the center of radiation is the center of distribution. For an antenna with asymmetrical current distribution, the center of radiation is the center of current moments when viewed from directions near the direction of maximum radiation. (AP/PE/ANT) 145-1993, 599-1985

effective height antenna (1) (A) (data transmission) The height of its center of radiation above the effective ground level. **(B) (data transmission)** In low-frequency applications, the term "effective height" is applied to loaded or nonloaded vertical antennas and is equal to the moment of the current distribution in the vertical section, divided by the input current. *Note:* For an antenna with symmetrical current distribution, the center of radiation is the center of distribution. For an antenna with asymmetrical current distribution, the center of radiation is the center of current moments when viewed from directions near the direction of maximum radiation. *See also:* antenna. (PE) 599-1985

(2) (mobile communication) The height of the center of a vertical antenna (of at least 1.4 wavelength) above the effective ground plane of the vehicle on which the antenna is mounted. *See also:* mobile communication system; antenna. (VT) [37]

effective inductance (1) (general) The imaginary part of an inductive impedance divided by the angular frequency. (IM/HFIM) [40]

(2) (winding) The self-inductance at a specified frequency and voltage level, determined in such a manner as to exclude the effects of distributed capacitance and other parasitic elements of the winding but not the parasitic elements of the core. (CHM) [51]

effective induction area of the control current loop (Hall effect devices) The effective area of the loop enclosed by the control current leads and the relevant conductive path through the Hall element. (MAG) 296-1969w

effective induction area of the output loop (Hall effect devices) The effective induction area of the loop enclosed by the leads to the Hall terminals and the relevant conductive path through the Hall plate. (MAG) 296-1969w

effective instruction (software) The computer instruction that results from performing any required indexing, indirect addressing, or other modification on the addresses in a specified computer instruction. *Note:* If the specified instruction requires no modification, it is also the effective instruction. *See also:* indirect instruction; presumptive instruction; immediate instruction; absolute instruction; direct instruction. (C) 610.12-1990, 610.10-1994w

effective isotropically radiated power *See:* equivalent isotropically radiated power.

effective length of a linearly polarized antenna For a linearly polarized antenna receiving a plane wave from a given direction, the ratio of the magnitude of the open circuit voltage developed at the terminals of the antenna to the magnitude of the electric field strength in the direction of the antenna polarization. *Notes:* 1. Alternatively, the effective length is the length of a thin straight conductor oriented perpendicularly to the given direction and parallel to the antenna polarization, having a uniform current equal to that at the antenna terminals and producing the same far-field strength as the antenna in that direction. 2. In low-frequency usage, the effective length of a vertically polarized ground-based antenna is frequently referred to as effective height. Such usage should not be confused with **effective height of an antenna** (high-frequency usage). (AP/ANT) 145-1993

effectively grounded (1) (power and distribution transformers) An expression that means grounded through a grounding connection of sufficiently low impedance (inherent or intentionally added, or both) that fault grounds that may occur cannot build up voltages in excess of limits established for apparatus, circuits, or systems so grounded. 1. 1. An alternating-current system or portion thereof may be said to be effectively grounded when, for all points on the system or specified portion thereof, the ratio of zero-sequence reactance to the positive-sequence reactance is less than three and the ratio of zero-sequence resistance to positive-sequence reactance is less than one for any condition of operation and for any amount of connected generator capacity. (PE/TR) C57.12.80-1978r

(2) Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to limit the buildup of voltages to levels below that which may result in undue hazard to persons or to connected equipment. (NESC) C2-1997

(3) (A) (grounding of industrial and commercial power systems) An expression that means grounded through a grounding connection of sufficiently low impedance (inherent or intentionally added or both) that ground fault that may occur cannot build up voltages in excess of limits established for apparatus, circuits, or systems so grounded. *Notes:* 1. An alternating-current system or portion thereof may be said to be effectively grounded when, for all points on the system or specified portion thereof, the ratio of zero-sequence reactance to positive-sequence reactance is not greater than three and the ratio of zero-sequence resistance to positive-sequence reactance is not greater than one for any condition of operation and for any amount of connected generator capacity. 2. This definition is basically used in the application of line-to-neutral surge arresters. surge arresters with less than line-to-line voltage ratings are applicable on effectively grounded systems. *See also:* ground; grounded. **(B) (system grounding)** Grounded through a sufficiently low impedance such that for all system conditions the ratio of zero-sequence reactance (X_0/X_1) is positive and less than 3, and the ratio of zero-sequence resistance to positive-sequence reactance (R_0/X_1) is positive and less than 1. *Note:* The effectively grounded system permits the application of surge arresters with less than line-to-line voltage ratings. Ground fault currents will be approximately of the same magnitude as three-phase fault currents. (IA/PSE) 142-1982

effectively grounded system A system in which the neutral points are connected directly to the ground through a connection in which no impedance has been inserted intentionally. (PE/C) 1313.1-1996

effective ground plane (mobile communication) The height of the average terrain above mean sea level as measured for a distance of 100 meters out from the base of the antenna in the desired direction of communication. It may be considered the same as ground level only in open flat country. *See also:* mobile communication system. (VT) [37]

effective input impedance (1) (electron tube or valve) (output) The quotient of the sinusoidal component of the control-electrode voltage (output-electrode voltage) by the corresponding component of the current for the given electrical conditions of all the other electrodes. *See also:* ON period. (ED) [45], [84]

(2) (output) The quotient of voltage by current at the input port of a device when it is operating normally (usually steady-state). (CAS) [13]

effective height base station antenna (mobile communication) The height of the physical center of the antenna above the effective ground plane. *See also:* mobile communication system. (VT) [37]

effective length antenna (1) (A) (general) For an antenna radiating linearly polarized waves, the length of a thin, straight conductor oriented perpendicular to the direction of maximum radiation, having a uniform current equal to that at the antenna terminals and producing the same far field strength as the antenna. **(B) (general)** Alternatively, for the same antenna receiving linearly polarized waves from the same direction, the ratio of the open-circuit voltage developed at the terminals of the antenna to the component of the electric field strength in the direction of antenna polarization. *Notes:* 1. The two definitions yield equal effective lengths. 2. In low-frequency usage, the effective length of a ground-based antenna is taken in the vertical direction and is frequently referred to as effective height. Such usage should not be confused with effective height (of an antenna, high-frequency usage). *See also:* antenna. (AP/ANT) [35]

(2) The ratio of the antenna open-circuit voltage to the strength of the field component being measured. *See also:* electromagnetic compatibility. (EMC) [53]

effective medium The replacement of an inhomogeneous medium by an equivalent homogeneous medium having complex constitutive parameters derived from the propagation of the coherent (i.e., mean) field in the actual medium. The equivalent medium describes only the coherent field. (AP/PROP) 211-1997

effective mode volume (fiber optics) The square of the product of the diameter of the near-field pattern and the sine of the radiation angle of the far-field pattern. The diameter of the near-field radiation pattern is defined here as the full width at half maximum and the radiation angle at half maximum intensity. *Note:* Effective mode volume is proportional to the breadth of the relative distribution of power amongst modes in a multimode fiber. It is not truly a spatial volume but rather an "optical volume" equal to the product of area and solid angle. *See also:* radiation pattern; mode volume. (Std100) 812-1984w

effective multiplication factor The ratio of the average number of neutrons produced by nuclear fission in each generation to the total number of corresponding neutrons absorbed or leaking out of the system. If $k_{eff} = 1$, that is, the number of neutrons produced is equal to the number being absorbed or leaking out of the system, a stable, self-sustaining chain reaction exists and the assembly is said to be critical. If $k_{eff} > 1$, the chain reaction is not self-sustaining and will terminate, such a system is said to be subcritical. If $k_{eff} < 1$, the chain reaction is divergent and the system is supercritical. (PE/PSE) 858-1987s

effectiveness analysis An analysis of how well a design solution will perform or operate given anticipated operational scenarios. (C/SE) 1220-1998

effectiveness assessment The evaluation of the design solution with respect to manufacturing, test, distribution, operations, support, training, environmental impact, cost effectiveness, and life cycle cost. (C/SE) 1220-1998

effectiveness criteria The measure of value used to determine the success or failure of a design solution. (C/SE) 1220-1998

effective power The difference, expressed in dBm, between the absolute optical power, measured in milliwatts, at the midpoint in time of a high optical signal vs. the midpoint in time of a low optical signal. (C/BA) 1393-1999

effective radiated power (ERP) (1) In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half-wave dipole multiplied by the net power accepted by the antenna from the connected transmitter. *Synonym:* equivalent radiated power. *Contrast:* equivalent isotropically radiated power. (AP/ANT) 145-1993

(2) (mobile communication) The product in a given direction of the effective gain of the antenna in that direction over a half-wave dipole antenna, and the antenna power input. *See also:* mobile communication system. (VT) [37]

effective radius of the Earth (1) (radio-wave propagation) An effective value for the radius of the Earth that is used in place of the actual radius to correct approximately for atmospheric refraction. *Note:* Under conditions of standard refraction, the effective radius of the Earth is 8.5×10^6 m, or 4/3 the geometrical radius. (AP/PROP) 211-1997

(2) (data transmission) In radio transmission, a value which is used in place of the geometrical radius to correct for atmospheric refraction when the index of refraction in the atmosphere changes linearly with height. *Note:* Under conditions of standard refraction, the effective radius is 1.33 the geometrical radius. (PE) 599-1985w

effective range of measurement The range of values of the quantity to be measured by which the performance of a dosimeter meets the requirements of this standard. (NI) N42.20-1995

effective relative permeability A parameter frequently used to characterize the phase velocity of modes propagating on planar transmission lines containing a magnetic material as compared to a transmission line of the same configuration and equal dielectric constant, but with free space magnetic properties. It is the square of the ratio of the propagation constants of these two transmission lines. (MTT) 1004-1987w

effective relay actuation time The sum of the initial actuation time and the contact chatter intervals following such actuation. (EEC/REE) [87]

effective resistance The effective resistance, or ac resistance, of a series reactor is derived by dividing the total losses, as defined in (1), (2) and (3) above, by the current squared. (PE/TR) C57.16-1996

effective resistivity A factor such that the conduction current density is equal to the electric field in the material divided by the resistivity. (PE/PSIM) 81-1983

effective shielding That which permits lightning strokes no greater than those of critical amplitude (less design margin) to reach phase conductors. (SUB/PE) 998-1996

effective sound pressure (root-mean-square sound pressure) At a point over a time interval, the root-mean-square value of the instantaneous sound pressure at the point under consideration. In the case of periodic sound pressures, the interval must be an integral number of periods or an interval long compared to a period. In the case of nonperiodic sound pressures, the interval should be long enough to make the value obtained essentially independent of small changes in the length of the interval. *Note:* The term effective sound pressure is frequently shortened to sound pressure. (SP) [32]

effective speed of transmission Speed, less than rated, of information transfer that can be averaged over a significant period of time and that reflects effects of control codes, timing codes, error detection, retransmission, tabbing, hand keying, etc. (COM) [49]

effective strip width The strip width of an idealized planar transmission line introduced to model an actual physical structure having equivalent electrical characteristics of interest. Two examples are: effective width of microstrip (con-

ductor thickness correction). The width of a zero thickness microstrip introduced to represent the additional fringing capacitance associated with the finite thickness of the strip conductor; and effective width of microstrip (parallel plate waveguide model). The width of a parallel plate waveguide having magnetic wall boundaries and a height equal to the substrate thickness and having the same phase constant and characteristic impedance as the microstrip mode considered. (MTT) 1004-1987w

effective surface acoustic wave coupling coefficient K_s The electromechanical coupling coefficient $K_s^2 = 2|\Delta v/v|$ where $\Delta v/v$ is the relative velocity change produced by short-circulating the surface potential from the open circuit condition. (UFFC) 1037-1992w

effective synchronous reactance An assumed value of synchronous reactance used to represent a machine in a system study calculation for a particular operating condition. (PE) [9]

effective temperature (1) (laser maser) The temperature that must be used in the Boltzmann formula to describe the relative populations of two energy levels that may or may not be in thermal equilibrium. (LEO) 586-1980w

(2) An arbitrary index that combines, into a single value, the effects of temperature, humidity, and air movement on the sensation of hot or cold felt by the human body. (IA/PSE) 241-1990r

effective thermal resistance (semiconductor devices) (semiconductor rectifiers) The effective temperature rise per unit power dissipation of a designated junction, above the temperature of a stated external reference point under conditions of thermal equilibrium. *Note:* Thermal impedance is the temperature rise of the junction above a designated point on the case, in degrees Celsius per watt of heat dissipation. *See also:* rectification; semiconductor rectifier stack; semiconductor. (ED) 216-1960w

effective turns per phase (rotating machinery) The product of the number of series turns of each coil by the number of coils connected in series per phase and the winding factor. (PE) [9]

effective user ID An attribute of a process that is used in determining various permissions, including file access permissions. This value is subject to change during the process lifetime. *See also:* user ID. (C/PA) 9945-2-1993, 9945-1-1996, 1003.5-1999

effective voltage overshoot (arc-welding apparatus) The area under the transient voltage curve during the time that the transient voltage exceeds the steady-state value. *See also:* voltage recovery time. (EEC/AWM) [91]

effective X/R ratio The value of X/R as seen from the fault location looking back into the power system far enough to include the reduction of the X/R ratio due to the effects of the terminal apparatus. (PE/PSC) 367-1996

efferent Pertaining to a flow of data or control from a superordinate module to a subordinate module in a software system. *Contrast:* afferent. (C) 610.12-1990

efficacy *See:* lumens per watt.

efficiency (1) (x-ray energy spectrometers) (of a semiconductor radiation conductor for a monoenergetic radiation source) The ratio of the number of events in the spectral distribution to the total number of photons incident on the active detector volume during the same time interval. (NPS/NID) 759-1984r

(2) (converter characteristics) (of power conversion) The ratio of active (real) output power and active (real) input power. *Note:* Both powers are to be taken as the total average power as given by the formula:

$$P = \frac{1}{T}\int_0^T ei \quad dt$$

where T = the period for ac (alternating current) and the ripple period for dc (direct current). (IA/SPC) 936-1987w

(3) (rotating machinery) (from total loss) The method of indirect calculation of efficiency from the measurement of total loss. *See also:* direct-current commutating machine; asynchronous machine. (PE) [9]

(4) (rectification) Ratio of the direct-current component of the rectified voltage at the input terminals of the apparatus to the maximum amplitude of the applied sinusoidal voltage in the specified conditions. (ED) [45]

(5) (software) The degree to which a system or component performs its designated functions with minimum consumption of resources. *See also:* storage efficiency; execution efficiency. (C) 610.12-1990

(6) (rotating machinery) (by direct calculation) The method by which the efficiency is calculated from the input and output, these having been measured directly. *See also:* asynchronous machine; direct-current commutating machine. (PE) [9]

(7) (electric power systems in commercial buildings) The power (kW) output divided by the power (kW) input at rated output. (IA/PSE) 241-1990r

(8) The net number of counts registered by the detector system per unit of time, divided by the number of photons of interest originating in the radioactive source during the same unit of time. (NI) N42.12-1994

(9) (power and distribution transformers) (of a transformer) The ratio of the useful power output of a transformer to the total power input. (PE/TR) C57.12.80-1978r, C57.12.90-1999

(10) The output real power divided by the input real power. (IA/PSE) 1100-1999

(11) *See also:* counting efficiency. (NI/NPS) 309-1999

efficiency, effective *See:* effective efficiency.

efficiency, generator *See:* generator efficiency.

efficiency, generator, overall *See:* over-all generator efficiency.

efficiency, generator, reduced *See:* reduced generator efficiency.

efficiency, load circuit *See:* load-circuit efficiency.

efficiency, overall electrical *See:* over-all electrical efficiency.

efficiency, quantum *See:* quantum efficiency.

effluent (1) (monitoring radioactivity in effluents) The liquid or gaseous waste streams released to the environment. (NI) N42.18-1980r

(2) (radiological monitoring instrumentation) Liquid or airborne radioactive materials released to the environs. (NI) N320-1979r

effluve *See:* convective discharge.

E Filter A 1 kHz to 50 kHz bandpass filter used for measuring the power of a digital data signal, noise, or impulse noise on an ISDN basic access digital subscriber line. (COM/TA) 743-1995

EFTS *See:* electronic funds transfer system.

EGM *See:* electrogeometric model.

egoless programming (software) A software development technique based on the concept of team, rather than individual, responsibility for program development. Its purpose is to prevent individual programmers from identifying so closely with their work that objective evaluation is impaired. (C) 610.12-1990

egress The process whereby signals exit the cable system; i.e., signal leakage. (LM/C) 802.7-1989r

EHF *See:* extremely high frequency.

E-H tee (waveguide components) A junction composed of E- and H-plane tee junctions wherein the axes of the arms intersect at a common point in the main guide. *Note:* Compare to "hybrid tee." (MTT) 147-1979w

E-H tuner (waveguide components) An E-H tee having E and H arms terminated in movable open- or short-circuit terminations. (MTT) 147-1979w

EHV *See:* extra-high voltage.

EI *See:* end injection.

EIA *See:* Electronic Industries Association.

EIA-232-D *See:* RS-232-C; EIA/TIA-232-E.

EIA-422-A An EIA standard that specifies electrical characteristics for balanced transmission in which each of the main circuits has its own ground lead. *Note:* There is a 10 Mb/s limit on speed. *Synonym:* RS-422-A. (C) 610.7-1995

EIA-423-A An EIA standard that specifies electrical characteristics for unbalanced circuits using common or shared grounding techniques. *Note:* There is a 300 kb/s limit on speed. *Synonym:* RS-423-A. (C) 610.7-1995

EIA-530 An EIA standard which uses the 25-pin connector commonly associated with EIA-232-D. Note. Represents high-speed electrical characteristics of EIA-422-A and 423-A. (C) 610.10-1994w

EIA/TIA-232-E An EIA/TIA standard for asynchronous serial data communications between terminal devices, such as printers; computers; and communications devices, such as modems. *Note:* IEEE Std 610.7-1995 defines a 25-pin (DB-25) connector and certain electrical and mechanical characteristics for interfacing computer equipment. There is a 20 kb/s limit on speed and 15 m (50 ft) cable limit. *Synonyms:* RS-232; RS-232-C; EIA-232-D. (C) 610.7-1995

EIA/TIA-530-A An EIA/TIA physical and mechanical standard that specifies cabling and connectors for EIA-422-A and EIA-423-A interfaces. IEEE Std 610.7-1995 defines a 37-pin (DB-37) and 9-pin (DB-9) connector. *Synonym:* RS-449. (C) 610.7-1995

EIF *See:* electronic counter-countermeasures (ECCM) improvement factor.

EIFFEL An object-oriented programming language. (C) 610.13-1993w

8B/10B encoding A byte-oriented encoding scheme developed by IBM which encodes 8-bit data into "dc balanced" 10-bit symbols. 8B/10B encoding guarantees a minimum of four (4) non-return-to-zero (NRZ) transitions per 10-bit symbol and, with "running disparity," produces a bit stream with zero dc offset. (C/BA) 1393-1999

eight-bit byte *See:* octet.

eight-hour rating (magnetic contactor) The rating based on its current-carrying capacity for eight hours, starting with new clean contact surfaces, under conditions of free ventilation, with full-rated voltage on the operating coil, and without causing any of the established limitations to be exceeded. (IA/IAC) [60]

eight-pin modular An eight-wire connector. (LM/C) 802.3u-1995s

einschleichender stimulus *See:* accumulating stimulus.

Einstein's law (photoelectric device) The law according to which the absorption of a photon frees a photo-electron with a kinetic energy equal to that of the photon less the work function

$\frac{1}{2} mv^2 = hv - p$ (if $hv > p$)

See also: photoelectric effect. (Std100) [84]

EIRP *See:* equivalent isotropically radiated power.

EIS *See:* executive information system.

EITHER-OR* *See:* OR.

* Deprecated.

either-way operation *See:* two-way alternate operation.

eject (A) To remove, either manually or under software control, a storage medium, from the storage device; for example, to eject a diskette from a disk drive. **(B)** To advance a printer to the top of the next page to be printed. *Note:* This is commonly called a "form feed." (C) 610.10-1994

EL1 An extensible language that includes most of the concepts of ALGOL 60 and LISP, but with a syntax similar to ALGOL. (C) 610.13-1993w

elapsed time Counting time uncompensated for periods in which an instrument might be unable to respond. Elapsed time of a count equals live time plus dead time. (NI) N42.14-1991

elapsed time printout (sequential events recording systems) The recording of time interval between first and successive detected events. (PE/EDPG) [1]

elastances (system of conductors) (coefficients of potential—maxwell) A set of n conductors of any shape that are insulated from each other and that are mounted on insulating supports within a conducting shell, or on one side of a conducting sheet of infinite extent or above the surface of the earth constitutes a system of n capacitors having mutual elastances and capacitances. *Note:* If the shell (or the earth) is regarded as the electrode common to all n capacitors and the transfers of charge as taking place between shell and the individual electrodes, the sum of the charges on the conductors will be equal and opposite in sign to the charge on the common electrode. The shell (or the earth) is taken to be at zero potential. Let Q_r represent the value of the charge that has been transferred from the shell to the other electrode of the rth capacitor,and let V_r represent the algebraic value of the potential of this electrode resulting from the charges in all n capacitors. If the charges are known the values of the potentials can be computed from the equations:

$$V_1 = S_{11}Q_1 + S_{12}Q_2 + S_{13}Q_3 + \ldots$$

$$V_2 = S_{21}Q_1 + S_{22}Q_2 + S_{23}Q_3 + \ldots$$

$$V_3 = S_{31}Q_1 + S_{32}Q_2 + S_{33}Q_3 + \ldots$$

$$V_r = \sum_{c=1}^{c=n} S_{r,c}Q_c$$

The multiplying operators $S_{r,r}$ are the self-elastances and the multipliers $S_{r,c}$ are the mutual elastances of the system. Maxwell termed them the coefficients of potential of the system. Their values can be measured by noting that the defining equation for the mutual elastance $S_{r,c}$ is

$$S_{r,c}\ (\text{reciprocal farad*}) = \frac{V_r(\text{volt})}{Q_c(\text{coulomb})}$$

(every Q except Q_c being zero)

It can be shown that $S_{r,c} = S_{c,r}$ and that under the conventions stated all the elastances have positive values. Formerly, sometimes called the daraf. (Std100) 270-1966w

elastic buffer A variable delay element inserted in the ring by the active monitor to ensure that ring latency remains constant when the cumulative latency changes. (C/LM) 8802-5-1998

elasticity buffer A first-in-first-out (FIFO) buffer in the network repeater that can provide temporary storage for a message packet during retransmission delays. The buffer acts as a shift register or delay line, and does not need to hold an entire, full-length packet. *See also:* store-and-forward bufferlocal area networks. (C) 8802-12-1998

elastic-restraint coefficient (inertial sensors) (gyros) The ratio of gimbal restraining torque about an output axis to the output angle. (AES/GYAC) 528-1994

elastic-restraint drift rate (gyros) The component of systematic drift rate that is proportional to the angular displacement of a gyro gimbal about an output axis. The relationship of this component of drift rate to gimbal angle can be stated by means of a coefficient having dimensions of angular displacement per unit time per unit angle. This coefficient is equal to the elastic-restraint coefficient divided by angular momentum. (AES/GYAC) 528-1994

elastomer (rotating machinery) Macromolecular material that returns rapidly to approximately the initial dimensions and shape after substantial deformation by a weak stress and release of the stress. *See also:* asynchronous machine. (PE) [9]

E layer An ionized layer in the E region. The ionization within the E region is highly correlated with the incident solar flux. Therefore, the normal E layer is present only during daytime. (AP/PROP) 211-1997

elbow (separable insulated connectors) A connector component for connecting a power cable to a bushing, so designed that when assembled with the bushing, the axes of the cable and bushing are perpendicular. *See also:* corner. (T&D/PE) 386-1995

electric (1) Containing, producing, arising from, actuated by, or carrying electricity, or designed to carry electricity and capable of so doing. Examples: Electric eel, energy, motor, vehicle, wave. *Note:* Some dictionaries indicate electric and electrical as synonymous but usage in the electrical engineering field has in general been restricted to the meaning given in the definitions above. It is recognized that there are borderline cases wherein the usage determines the selection. *See also:* electrical. (SWG/PE) [56]
(2) Containing, producing, arising from, actuated by, or carrying electricity, or designed to carry electricity and capable of so doing. *Examples:* Electric eel, energy, motor, vehicle, wave. (SWG/PE) C37.100-1992

electric air-compressor governor A device responsive to variations in air pressure that automatically starts or stops the operation of a compressor for the purpose of maintaining air pressure in a reservoir between predetermined limits. (EEC/PE) [119]

electrical (1) (general) Related to, pertaining to, or associated with electricity, but not having its properties or characteristics. Examples: Electrical engineer, handbook, insulator, rating, school, unit. *Note:* Some dictionaries indicate electric and electrical as synonymous but usage in the electrical engineering field has in general been restricted to the meaning given in the definitions above. It is recognized that there are borderline cases wherein the usage determines the selection. *See also:* electric. (SWG/PE) [56]
(2) Related to, pertaining to, or associated with electricity but not having its properties or characteristics. *Examples:* Electrical engineer, handbook, insulator, rating, school, unit. (SWG/PE) C37.100-1992

electrical accomodation (electrobiology) (biology) A rise in the stimulation threshold of excitable tissue due to its electrical environment, often observed following a previous stimulation cycle. *See also:* excitability. (EMB) [47]

electrical accounting machine A machine that is predominantly electromechanical in nature. Examples include keypunches, mechanical sorters, collators, and tabulators. (C) 610.10-1994w

electrical anesthesia (medical electronics) More or less complete suspension of general or local sensibility produced by electric means. (EMB) [47]

electrical arc (gas) A discharge characterized by a cathode drop that is small compared with that in a glow discharge. *Note:* The electron emission of a cathode is due to various causes (thermionic emission, high-field emission, etc.) acting simultaneously or separately, but secondary emission plays only a small part. *See also:* discharge. (Std100) [84]

electrical back-to-back test *See:* pump-back test.

electrical boresight *See:* electric boresight.

electrical center *See:* electric center.

electrical codes (1) (general) A compilation of rules and regulations covering electric installations.
(2) (official electrical code) One issued by a municipality, state, or other political division, and which may be enforced by legal means.
(3) (unofficial electrical code) One issued by other than political entities such as engineering societies, and the enforcement of which depends on other than legal means.
(4) The code of rules and regulations as recommended by the National Fire Protection Association (NFPA) and approved by the American National Standards Institute (ANSI). *Note:* This code is the accepted minimum standard for electric installations and has been accepted by many political entities as their official code, or has been incorporated in whole or in part in their official codes.
(5) A set of rules, prepared by the National Electrical Safety Code committee (secretariat held by the Institute of Electrical and Electronics Engineers) and approved by the American National Standards Institute governing: Methods of grounding; Installation and maintenance of electric-supply stations and equipment; Installation and maintenance of overhead supply and communication lines; Installation and maintenance of underground and electric-supply and communications lines; Operation of electric-supply and communication lines and equipment (Work Rules).

electrical conductor seal, double (nuclear power generating station) An assembly of two single electrical conductor seals in series and arranged in such a way that there is a double pressure barrier seal between the inside and the outside of the containment structure along the axis of the conductors. (PE/NP) 380-1975w

electrical conductor seal, single (nuclear power generating station) A mechanical assembly providing a single pressure barrier between the electrical conductors and the electrical penetration assembly. (PE/NP) 380-1975w

electrical coupling Electrical charges in conductors of a disturbed circuit formed by electrical induction. Since the ratio of a conductor's electrostatic charge to the potential difference between conductors (required to maintain that charge) is the general definition of capacitance, electrical coupling is also called capacitive coupling. Its magnitude depends on the cable geometry and the cable insulation properties: dielectric constant and dissipative losses. Magnetic coupling introduces electromotive force in the disturbed circuit due to magnetic induction. This electromotive force opposes the change in the current that generated it. *Synonym:* capacitive coupling. (PE/IC) 1143-1994r

electrical degree (rotating machinery) The 360th part of the angle subtended, at the axis of a machine, by two consecutive field poles of like polarity. One mechanical degree is thus equal to as many electrical degrees as there are pairs of poles in the machine. *See also:* direct-current commutating machine. (PE) [9]

electrical distance (navigation aid terms) The distance between two points expressed in terms of the duration of travel of an electromagnetic wave in free space between the two points. *Note:* An often used unit of electrical distance is the light-microsecond, approximately 300 m (983 ft). (AES/GCS) 172-1983w

electrical equipment (1) A general term that is applied to materials, fittings, devices, fixtures, and apparatus that are a part of, or are used in connection with, an electrical installation. This includes the electrical power generating system; substations; distribution systems including cable and wiring; utilization equipment; and associated control, protective, and monitoring devices. (IA/PSE) 902-1998
(2) A general term including materials, fittings, devices, appliances, fixtures, apparatus, machines, etc., used as a part of, or in connection with, an electric installation. (IA/PSE) 493-1997

electrical failure (of a circuit breaker) Failure attributable to the application of electrical stresses to the main circuit of the circuit-breaker. (SWG/PE) C37.10-1995

electrical installation, insulation (cable) (electric pipe heating systems) A part that is relied upon to insulate the conductor from other conductors or conducting parts or from ground. Electrical insulation as related to electric pipe heating systems includes that part of a heater that electrically insulates the current carrying conductor(s) from the sheath material. (PE/EDPG) 622-1979s

electrical insulating material (thermal classification of electric equipment and electrical insulation) A substance in which the electrical conductivity is very small (approcahing zero) and provides electric isolation. (EI) 1-1986r

electrical insulation A dielectric material that insulates each conductor from other conductors or from conductive parts at or near earth potential. (IA) 515-1997

electrical insulation system (thermal classification of electric equipment and electrical insulation) An insulating material or a suitable combination of insulating materials specifically designed to perform the functions needed in electric and electronic equipment. (EI) 1-1986r

electrical interchangeability (of fuse links or fuse units) The characteristic that permits the designs of various manufacturers to be used interchangeably so as to provide a uniform degree of overcurrent protection and fuse coordination. (SWG/PE) C37.100-1992, C37.40-1993

electrical length (1) (A) (two-port network at a specified frequency) The length of an equivalent lossless reference waveguide or reference air line (which in the ideal case would be evacuated) introducing the same total phase shift as the two-port when each is terminated in a reflectionless termination. *Note:* It is usually expressed in fractions or multiples of waveguide wavelength. When expressed in radians or degrees it is equal to the phase angle of the transmission coefficient + $2n\pi$. *See also:* waveguide. **(B) (waveguide)** For a traveling wave of a given frequency, a distance in a transmission or guiding medium expressed in wavelengths of the wave in the medium. *Note:* Electrical length is sometimes expressed in radians or degrees. (MTT) 146-1980

(2) For a wave of a given frequency, a distance between field-points, expressed in wavelengths of the wave in the medium. *Note:* The electrical length is sometimes expressed in radians or degrees. *See also:* phase path length. (AP/PROP) 211-1997

electrical load (power operations) Electric power used by devices connected to an electrical generating system. (PE/PSE) 858-1987s

electrically connected Connected by means of a conducting path or through a capacitor, as distinguished from connection merely through electromagnetic induction. *See also:* inductive coordination. (EEC/PE) [119]

electrically alterable read-only memory A type of read-only memory that can be erased electrically. *See also:* electrically erasable programmable read-only memory. (C) 610.10-1994w

electrically erasable programmable read-only memory (EEPROM) (1) A type of read-only memory that can be erased and reprogrammed by electronic methods. (C) 610.10-1994w

(2) A reprogrammable read-only memory in which the cells at each address can be erased electrically and reprogrammed electrically. *Note:* These devices are characterized by slower write times than read times. The memory is used for applications that specify a maximum number of write operations. (ED) 1005-1998, 641-1987w

electrically heated airspeed tube A Pitot-static or Pitot-Venturi tube utilizing a heating element for deicing purposes. (EEC/PE) [119]

electrically heated flying suit A garment that utilizes sewn-in heating elements energized by electric means designed to cover the torso and all or part of the limbs. *Note:* It may be a one-piece garment or consist of a coat, trousers, and the like. The lower portion of the one-piece suit is in trouser form. (EEC/PE) [119]

electrically interlocked manual release of brakes (control) A manual release provided with a limit switch that is operated when the braking surfaces are disengaged manually. *Note:* The limit switch may operate a signal, open the control circuit, or perform other safety functions. *See also:* switch. (IA/ICTL/IAC) [60]

electrically operated valve (power system device function numbers) An electrically operated, controlled or monitored valve used in a fluid line. *Note:* The functions of the valve may be indicated by the use of the suffixes in 3.3 of IEEE Std C37.2-1979. (SUB/PE) C37.2-1979s

electrically programmable Pertaining to any memory in which binary digits may be entered electrically using a special programming device. This process is often referred to as "burning." (C) 610.10-1994w

electrically release-free (as applied to an electrically operated switching device) A term indicating that the release can open the device even though the closing control circuit is energized. *Note:* Electrically release-free switching devices are usually arranged so that they are also anti-pump. With such an arrangement, the closing mechanism will not reclose the switching device after opening until the closing control circuit is opened and again closed. *Synonym:* electrically trip-free. (SWG/PE) C37.100-1992

electrically reset relay A relay that is so constructed that it remains in the picked-up condition even after the input quantity is removed; an independent electrical input is required to reset the relay. (SWG/PE) C37.100-1992

electrically short dipole A dipole whose total length is small compared to the wavelength. *Note:* For the common case that the two arms are collinear, the radiation pattern approximates that of a Hertzian dipole. (AP/ANT) 145-1993

electrically small antenna An antenna whose dimensions are such that it can be contained within a sphere whose diameter is small compared to a wavelength at the frequency of operation. (AP/ANT) 145-1993

electrically suspended gyro (ESG) A free gyro in which the main rotating element—the inertial member—is suspended by an electrostatic or an electromagnetic field within an evacuated enclosure. (AES/GYAC) 528-1994

electrically trip-free *See:* electrically release-free.

electrical metallic tubing A thin-walled metal raceway of circular cross section constructed for the purpose of the pulling in or the withdrawing of wires or cables after it is installed in place. *See also:* raceway. (EEC/PE) [119]

electrical noise (1) Unwanted voltage or current, or both, that appears in an electrical system. For given system characteristics, electrical noise may or may not impair proper functioning. The unwanted noise can have effects that range from totally undetectable to system malfunction or even damage or destruction. (PE/IC) 1143-1994r

(2) Unwanted electrical signals that produce undesirable effects in the circuits of the control systems in which they occur. (IA/PSE/ICTL) 1100-1999, 518-1982r

electrical null (accelerometer) (gyros) The minimum electrical output. It may be specified in terms of rms, peak-to-peak, quadrature component, or other electrical parameters. (AES/GYAC) 528-1994

electrical null position (gyros) (accelerometer) The angular or linear position of a pickoff corresponding to electrical null. (AES/GYAC) 528-1994

electrical objective loudness rating (loudness ratings of telephone connections) For a network

$$\text{EOLR} = -20 \log_{10} \frac{V_T}{1/2V_W}$$

where

V_W = open-circuit voltage of the electric source (in millivolts)

V_T = output voltage of the network (in millivolts)

(COM/TA) 661-1979r

electrical operation Power operation by electric energy. (SWG/PE) C37.100-1992

electrical penetration assembly (nuclear power generating station) An electrical penetration assembly provides the means to allow passage of one or more electrical circuits through a single aperture (nozzle or other opening) in the containment pressure barrier, while maintaining the integrity of the pressure barrier. (PE/NP) 380-1975w

electrical penetration assembly current capacity (nuclear power generating station) The maximum current that each conductor in the assembly is specified to carry for its duty cycle in the design service environment without causing stabilized temperatures of the conductors or the penetration nozzle-concrete interface (if applicable) to exceed their design limits. (PE/NP) 380-1975w

electrical penetration assembly short-time overload rating (nuclear power generating station) The limiting overload current that any one third of the conductors (but in no case less than three of the conductors) in the assembly can carry, for a specified time, in the design service environment, while all remaining conductors carry rated continuous current, without causing the conductor temperatures to exceed those values recommended by the insulated conductor manufacturer as the short-time overload conductor temperature and without causing the stabilized temperature of the penetration nozzle-concrete interface (if applicable) to exceed its design limit. (PE/NP) 380-1975w

electrical pitch The distance between two adjacent connections to the electrical backplane. (C/BA) 14536-1995

electrical preventive maintenance A system of planned inspection, testing, cleaning, drying, monitoring, adjusting, corrective modification, and minor repair of electrical equipment to minimize or forestall future equipment operating problems or failures, which, depending upon equipment type, may require exercising or proof testing. (IA/PSE) 493-1997

electrical range The range expressed in equivalent electrical units. *See also:* instrument; electrical distance. (EEC/EMI) [112]

electric rate tariff *See:* electric rate schedule.

electrical reference plane (standard connector) A transverse plane of the waveguide or transmission line on the drawing standardizing the critical mating dimensions shown in relation to the mechanical reference plane. *Notes:* 1. The electrical reference planes of two mating standard connectors forming a mated standard connector pair nearly coincide. 2. The electrical and mechanical reference planes of standard connectors do not necessarily coincide except for precision coaxial connectors complying with IEEE Std 287-1968[w], Precision Coaxial Connectors, and many connectors for uniconductor waveguides. (IM/HFIM) 474-1973w

electrical reserve (power operations) (electric power supply) The capacity in excess of that required to carry the system load. (PE/PSE) 858-1987s, 346-1973w

electrical resistance heat tracing (1) The utilization of electric heating cables, other electric heating devices, and support components that are externally applied and used to reduce or eliminate ice build-up, to prevent the freezing of pipes or surfaces, or to maintain a pipe or surface at a prescribed temperature. (IA/PC) 515.1-1995

(2) The utilization of electric heating cables, other electric heating devices, and support components that are externally applied and used to maintain or raise the temperature of fluids/materials in piping and associated equipment. (IA) 515-1997

electrical system The existing utility network consisting of interconnected and synchronized generation, transmission, and distribution facilities. (SUB/PE) 1109-1990w

electrical utility (terrestrial photovoltaic power systems) An organization that provides and distributes electric energy to consumers. In the utility interconnected configuration, solar photovoltaic (PV) systems may be interactive with the utility distribution network to permit the interchange of electric power and energy. *See also:* array control. (PV) 928-1986r

electrical zero* *See:* electrical null position.

* Deprecated.

electric back-to-back test *See:* pump-back test.

electric battery A device that transforms chemical energy into electric energy. *See also:* battery. (PE) 599-1985w

electric bell An audible signal device consisting of one or more gongs and an electromagnetically actuated striking mechanism. *Note:* The gong is the resonant metallic member that produces an audible sound when struck. However, the term going is frequently applied to the complete electric bell. (EEC/PE) [119]

electric bias, relay *See:* relay electric bias.

electric blasting cap A device for detonating charges of explosives electrically. *See also:* blasting unit.

electric boresight The tracking axis as determined by an electric indication, such as the null direction of a conical-scanning or monopulse antenna system, or the beam-maximum direction of a highly directive antenna. *See also:* reference boresight. (AP/ANT) 145-1983s

electric brake A mode of operation of the propulsion system in which retardation is provided. *Note:* Although generally considered synonymous with dynamic brake, electric brake is a more global term, in that it includes the possibility of providing retardation by drawing power from the line or by other means not dependent on conversion of kinetic energy into retarding power, which is the key element of dynamic braking. (VT) 1475-1999

electric braking A system of braking wherein electric energy, either converted from the kinetic energy of vehicle movement or obtained from a separate source, is one of the principal agents for the braking of the vehicle or train. *See also:* regenerative braking; magnetic track braking; electropneumatic brake. (EEC/PE) [119]

electric bus A passenger vehicle operating without track rails, the propulsion of which is effected by electric motors mounted on the vehicle. *Note:* A prefix diesel-electric, gas-electric, etc., may replace the word electric. *See also:* trolley coach. (EEC/PE) [119]

electric-cable-reel mine locomotive An electric mine locomotive equipped with a reel for carrying an electric conductor cable that is used to conduct power to the locomotive when operating beyond the trolley wire. *See also:* electric mine locomotive. (EEC/PE) [119]

electric capacitance altimeter An altimeter, the indications of which depend on the variation of an electric capacitance with distance from the earth's surface. (EEC/PE) [119]

electric center (of a power system out of synchronism) A point at which the voltage is zero when a machine is 180° out of phase with the rest of the system. *Note:* There may be one or more electrical centers depending on the number of machines and the interconnections among them. (SWG/PE) C37.100-1992

electric charge time constant (detector) The time required, after the instantaneous application of a sinusoidal input voltage of constant amplitude, for the output voltage across the load capacitor of a detector circuit to reach 63% of its steady-state value. *See also:* electromagnetic compatibility. (INT) [53], [70]

electric coal drill An electric motor-driven drill designed for drilling holes in coal for placing blasting charges. (EEC/PE) [119]

electric components (generating stations electric power system) The electric equipment, assemblies, and conductors that to-gether form the electric power systems. (PE/EDPG) 505-1977r

electric conduction and convection current density At any point at which there is a motion of electric charge, a vector quantity whose direction is that of the flow of positive charge at this point, and whose magnitude is the limit of the time rate of flow of net (positive) charge across a small plane area perpendicular to the motion, divided by this area as the area taken approaches zero in a macroscopic sense, so as to always include this point. *Note:* The flow of charge may result from the movement of free electrons or ions but is not, in general, except in microscopic studies, taken to include motions of charges resulting from the polarization of the dielectric. (Std100) 270-1966w

electric conductivity The property of a material or medium permitting flow of electricity through its volume, expressed as the ratio of electric current density to electric field strength in a material or medium. For isotropic homogeneous media, the conductivity is a scalar quantity, with the preferred unit siemens per meter (S/m); 1 S/m = 1 mho/m. (T&D/PE) 539-1990, 1227-1990r

electric console lift An electrically driven mechanism for raising and lowering an organ console and the organist. *See also:* elevator. (EEC/PE) [119]

electric constant (permittivity or capacitivity of free space pertinent to any system of units) The scalar ε_0 that in that system relates the electric flux density D, in empty space, to the electric field strength $E(D = \varepsilon_0 E)$. *Notes:* 1. It also relates the mechanical force between two charges in empty space to their magnitudes and separation. Thus, in the equation

$$F = Q_1 Q_2/(n\varepsilon_0 r^2)$$

for the force F between charges Q_1 and Q_2 separated by a distance r, ε_0 is the electric constant, and n is a dimensionless factor that is unity in unrationalized systems and 4π in a rationalized system. 2. In the International System of Units (SI), the magnitude of ε_0 is that of $10^7/(4\pi c^2)$ and the dimension is $(L^{-3}M^{-1}T^4I^2)$. Here, c is the speed of light expressed in the appropriate system of units. (Std100) 270-1966w

electric contact The junction of conducting parts permitting current to flow. (EEC/PE) [119]

electric controller A device (or group of devices) that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. (IA/MT) 45-1998

electric-controller rail car A trail car used in a multiple-unit train, provided at one or both ends with a master controller and other apparatus necessary for controlling the train. *See also:* electric trail car; electric motor car. (EEC/PE) [119]

electric coupler (1) A group of devices (plugs, receptacles, cable, etc.) that provides for readily connecting or disconnecting electric circuits. (EEC/PE) [119]

(2) A device used to allow trainline signals to be transmitted from vehicle to vehicle or unit to unit in a train, with the connection of trainlines performed automatically when vehicles are coupled. (VT) 1475-1999

electric coupler plug The removable portion of an electric coupler. (EEC/PE) [119]

electric coupler receptacle (electric coupler socket) The fixed portion of an electric coupler. (EEC/PE) [119]

electric coupler socket *See:* electric coupler receptacle.

electric coupling (1) A device for transmitting torque by means of electromagnetic force in which there is no mechanical torque contact between the driving and driven members. The slip type electric coupling has poles excited by direct current on one rotating member, and an armature winding, usually of the double squirrel cage type, on the other rotating member. (IA/MT) 45-1998

(2) *See also:* coupling. (PE/PSC) 487-1992

electric course recorder A device that operates, under control of signals from a master compass, to make a continuous record of a ship's heading with respect to time. (EEC/PE) [119]

electric crab-reel mine locomotive An electric mine locomotive equipped with an electrically driven winch, or crab reel, for the purpose of hauling cars by means of a wire rope from places beyond the trolley wire. *See also:* electric mine locomotive. (EEC/PE) [119]

electric current The flow of electric charge. The preferred unit is the ampere (A). (T&D/PE) 539-1990

electric current density A vector-point function describing the magnitude and direction of charge flow per unit area. The preferred unit is A/m^2. (T&D/PE) 539-1990

electric delay line *See:* electromagnetic delay line.

electric depth recorder A device for continuously recording, with respect to time, the depth of water determined by an echo sounding system. (EEC/PE) [119]

electric design automation application Any software program that interacts with the delay and power calculation module (DPCM) through the procedural interface (PI) to compute instance specific timing values. Examples include batch delay calculators, synthesis tools, floorplanners, static timing analyzers, etc. *See also:* delay and power calculation module; procedural interface. (C/DA) 1481-1999

electric dipole (1) (general) An elementary radiator consisting of a pair of equal and opposite oscillating electric charges an infinitesimal distance apart. *Note:* It is equivalent to a linear current element. (AP/ANT) 149-1979r, [35], 145-1983s

(2) The limit of an electric doublet as the separation approaches zero while the moment remains constant. (Std100/ANT) 270-1966w

(3) *See also:* Hertzian electric dipole. (AP/ANT) 145-1983s

electric dipole moment (two point charges, q and $-q$, a distance a apart) A vector at the midpoint between them, whose magnitude is the product qa and whose direction is along the line between the charges from the negative toward the positive charge. (Std100) 270-1966w

electric-discharge lamp (gas discharge) (illuminating engineering) A lamp in which light (or radiant energy near the visible spectrum) is produced by the passage of an electric currrent through a vapor or a gas. *Note:* Electric-discharge lamps may be named after the filling gas or vapor which is responsible for the major portion of the radiation; for example, mercury lamps, sodium lamps, neon lamps, argon lamps, etc. A second method of designating electric-discharge lamps is by physical dimensions or operating parameters; for example, short-arc lamps, high-pressure lamps, low-pressure lamps, etc. A third method of designating electric-discharge lamps is by their application; in addition to lamps for illumination there are photochemical lamps, bactericidal lamps, blacklight lamps, sun lamps, etc. (EEC/IE) [126]

electric-discharge time constant (detector) The time required, after the instantaneous removal of a sinusoidal input voltage of constant amplitude, for the output voltage across the load capacitor of the detector circuit to fall to 37% of its initial value. *See also:* electromagnetic compatibility. (INT) [53], [70]

electric displacement *See:* electric flux density.

electric displacement density *See:* electric flux density.

electric drive A system consisting of one or several electric motors and of the entire electric control equipment designed to govern the performance of these motors. The control equipment may or may not include various rotating electric machines. (IA/ICTL/IAC) [60]

electric driving machine A machine where the energy is applied by an electric motor. *Note:* It includes the motor and brake and the driving sheave or drum together with its connecting gearing, belt, or chain, if any. *See also:* driving machine. (EEC/PE) [119]

electric elevator A power elevator where the energy is applied by means of an electric motor. *See also:* elevator. (EEC/PE) [119]

electric energy (1) The electric energy delivered by an electric circuit during a time interval is the integral with respect to time of the instaneous power at the terminals of entry of the circuit to a delimited region. *Note:* If the reference direction for energy flow is selected as into the region when the sign of the energy is positive and out of the region when the sign is negative. If the reference direction is selected as out of the region, the reverse will apply. Mathematically,

$$W = \int_{t_0}^{t+t0} p\, dt$$

where
W = electric energy
p = instantaneous power
t = time during which energy is determined.

When the voltages and currents are periodic, the electric energy is the product of the active power and the time interval, provided the time interval is one or more complete periods or

is quite long in comparison with the time of one period. The energy is expressed by

$$W = pt$$

where
P = active power
t = time interval

If the instantaneous power is constant, as is true when the voltages and currents form polyphase symmetrical sets, there is no restriction regarding the relation of the time interval to the period. If the voltages and currents are quasi-periodic and amplitudes of the voltages and currents are slowly varying, the electric energy is the integral with respect to time of the active power, provided the integration is for a time that is one or more complete periods or that is quite long in comparison with the time of one period. Mathematically,

$$W = \int_{t_0}^{t+t_0} P\, dt$$

where P = active power determined for the condition of voltages and currents having slowly varying amplitudes. Electric energy is expressed in joules (watt-seconds) or watthours when the voltages are in volts and the currents in amperes, and the time interval is in seconds or hours, respectively.

(Std100/EDPG) 270-1966w

(2) Usually, electric demand integrated over the period of one hour. (PE/PSE) 858-1993w

electric explosion-tested mine locomotive An electric mine locomotive equipped with explosion-tested equipment. *See also:* electric mine locomotive. (EEC/PE) [119]

electric field ($\vec{E}$) (1) (general) A vector field of electric field strength or of electric flux density. *Note:* The term is also used to denote a region in which such vector fields have a significant magnitude. *See also:* vector field.

(Std100) 270-1966w

(2) (signal-transmission system) A state of a medium characterized by spatial potential gradients (electric field vectors) caused by conductors at different potentials, that is, the field between conductors at different potentials that have capacitance between them. *See also:* signal. (IE) [43]

(3) The field surrounding a charged object. *See also:* magnetic field. (PE/IC) 1143-1994r

(4) The electric force that acts on a unit electric charge independent of the velocity of that charge.

(AP/PROP) 211-1997

electric field induction (1) (capacitive coupling) The process of generating voltages or currents or both in a conductive object or electric circuit by means of time-varying electric fields. *Notes:* 1. "Electric field induction" is preferred over "electric induction" because the latter may be taken to mean electric flux density. 2. "Electric field induction" was formerly called "electrostatic induction." This usage is deprecated because electrostatic fields are time invariant.

(T&D/PE) 1048-1990

(2) (grounding of power lines) The induction process that results from time-varying quasi-static electric fields. *Notes:* 1. The term "electric field induction" is preferred over "electric induction" because the latter may be taken to mean electric flux density. 2. Electric field induction was formerly called "electrostatic induction." This usage is deprecated because electrostatic fields are time invariant.

(T&D/PE) 539-1990

(3) (capacitive coupling) The process of generating voltages and/or currents in conductive objects or electrical circuits by the induction process that results from time-varying quasi-static electric fields. *Notes:* 1. The term "electric field induction" is preferred over "electric induction" because the latter may be taken to mean electric flux density. 2. Electric field induction was formerly called electrostatic induction. This usage is deprecated because electrostatic fields are time invariant. (T&D/PE) 524a-1993r

electric field integral equation An integrodifferential equation having the form of a Fredholm integral equation of the first kind for the electric current density and its spatial derivative along the surface S of a perfect electric conductor. *Note:* The tangential component of the incident electric field acts as the source for the current, hence the name. The equation is as follows:

$$\hat{n} \times \vec{E}^i = \frac{j}{\omega\varepsilon_0}\, \hat{n} \times \int_{S_0} \{k_0^2 \vec{J}_S g - (\nabla_{S_0} \cdot \vec{J}_S)\nabla_0 g\} dS_0$$

where

$\hat{n}$ = unit normal to S
$\vec{E}^i$ = incident electric field
$j = \sqrt{-1}$
$k_0^2 = \omega^2 \mu_0 \varepsilon_0$
$\exp(j\omega t)$ = time convention
$g = \exp[-jk_0|\vec{r} - \vec{r}_0|]/4\pi|\vec{r} - \vec{r}_0|$
∇_0 = gradient evaluated on the surface
∇_{S_0} = gradient in the direction tangential to the surface

(AP/PROP) 211-1997

electric field strength (E) (1) (radio-wave propagation) (fly ash resistivity) (electric field) (kv/cm) (measurement of power frequency electric and magnetic fields from ac power lines) At a given point in space, the ratio of force on a positive test charge placed at the point to the magnitude of the test charge, in the limit that the magnitude of the test charge goes to zero. The electric field strength (E-field) at a point in space is a vector defined by its space components along three orthogonal axes. For steady-state sinusoidal fields, each space component is a complex number or phasor. The magnitudes of the components, expressed by their root-mean-square (rms) values in volts per meter (V/m), and the phases need not be the same. *Note:* The space components (phasors) are not vectors. The space components have a time dependent angle, while vectors have space angles. For example, the sinusoidal electric field E can be expressed in rectangular coordinates as

$$\vec{E} = \hat{a}_x E_x + \hat{a}_y E_y + \hat{a}_z E_z$$

The space component in the x-direction is

$$E_x = \mathrm{Re}\,(E_{x0}\, e^{j\varphi x}\, e^{j\omega t}) = E_{x0} \cos(\varphi_x + \omega t)$$

The magnitude, phase angle, and time dependent angle are given by E_{x0}, φ_x, and $(\varphi_x + \omega t)$, respectively. In this representation the space angle of the x-component is specified by the unit vector $\hat{a}_x$. An alternative general representation of a steady-state sinusoidal E-field, derivable algebraically from the above equation, and perhaps more useful in characterizing power line fields, is a vector rotating in a plane where it describes an ellipse whose semimajor axis represents the magnitude and direction of the maximum value of the electric field, and whose semiminor axis represents the magnitude and direction of the field a quarter cycle later. The electric field in the direction perpendicular to the plane of the ellipse is zero. *See also:* single-phase ac fields; phasor; polyphase ac fields. (T&D/PE) 644-1994

(2) The ratio of the applied voltage to the ash layer thickness in a test cell used for the laboratory measurement of electrical resistivity of fly ash. bulk density (g/cm^3) (fly ash resistivity). The ratio of ash layer is the ratio of the mass of the particulate in the test cell to the cell volume in a test cell used for the laboratory measurement of electrical resistivity of fly ash.

(PE/EDPG) 548-1984w

(3) (overhead power lines) A vector field, often denoted as $\vec{E}$ at a specific point. In a zero magnetic field, it is numerically equal to the force on a motionless unit positive test charge placed at that point. *Note:* In a zero magnetic field, the force $\vec{F}$ is given by $\vec{F} = q\vec{E}$. The magnitudes of the field components are expressed in volts per meter (V/m) (which dimensionally is the same as Newton/Coulomb). *Synonym:* electric field. *See also:* voltage gradient. (T&D/PE) 539-1990

(4) (waveguide) The magnitude of the electric (or magnetic) field vector. *Synonym:* magnetic field strength.

(MTT) 146-1980w

(5) The magnitude of the electric field vector $\vec{E}$. The units of electric field strength are in volts per meter. (AP/PROP) 211-1997

(6) A field vector quantity that represents the force (F) on a positive test charge (q) at a point divided by the charge.

$$E = \frac{F}{q}$$

Electric field strength is expressed in units of volts per meter (V/m). (NIR) C95.1-1999

electric field strength meter An instrument used to measure electric field strength. (T&D/PE) 539-1990

electric field vector (1) (at a point in an electric field) The force on a stationary positive charge per unit charge. *Notes:* 1. This may be measured either in newtons per coulomb or in volts per meter. This term is sometimes called the electric field intensity, but such use of the word intensity is deprecated since intensity connotes power in optics and radiation. *See also:* waveguide; radio-wave propagation. (MTT) 146-1980w

(2) (radio-wave propagation) At a point in an electric field, the force per unit charge acting on a stationary positive charge. *Notes:* 1. This may be expressed either in newtons coulomb or in volts/meter. This term has sometimes been called the electric field intensity, but such use of the word "intensity" is deprecated in favor of field strength since intensity connotes power in optics and radiation. 2. This term has sometimes been called the electric-field intensity, but such use of the word "intensity" is deprecated in favor of field strength, since intensity connotes power in optics and radiation. *Synonyms:* electric vector; electric field strength. (AP) 211-1977s

electric flux density ($\vec{D}$) A vector quantity related to the charge displaced within the medium by an electric field. The electric flux density is that function whose divergence is the charge density. *Note:* Using phasor notation, the electric flux density is given by:

$$\vec{D} = \varepsilon = \cdot \vec{E}$$

where

$\vec{D}$ = the electric flux density
$\varepsilon =$ = the permittivity in the medium
$\vec{E}$ = the electric field

In an isotropic medium, ε is a scalar and $\vec{D}$ is parallel to $\vec{E}$. In an anisotropic medium, $\varepsilon =$ is a tensor and $\vec{D}$ and $\vec{E}$ are not necessarily parallel. The units of electric flux density are in coulombs per meter squared. *Synonym:* electric displacement. (AP/PROP) 211-1997

electric focusing (microwave tubes) The combination of electric fields that acts upon the electron beam in addition to the forces derived from momentum and space charge. (ED) [45]

electric freight locomotive An electric locomotive, commonly used for hauling freight trains and generally designed to operate at higher tractive force values and lower speeds than a passenger locomotive of equal horsepower capacity. *Note:* A prefix diesel-electric, gas-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

electric gathering mine locomotive An electric mine locomotive, the chief function of which is to move empty cars into, and remove loaded cars from, the working places. *See also:* electric mine locomotive. (EEC/PE) [119]

electric generator A machine that transforms mechanical power into electric power. (IA/MT) 45-1998

electric gun heater An electrically heated element attached to the gun breech to prevent the oil from congealing or the gun mechanism from freezing. (EEC/PE) [119]

electric haulage mine locomotive An electric mine locomotive used for hauling trains of cars, that have been gathered from the working faces of the mine, to the point of delivery of the cars. *See also:* electric mine locomotive. (EEC/PE) [119]

electric horn A horn having a diaphragm that is vibrated electrically. *See also:* protective signaling. (EEC/PE) [119]

electric-hydraulic governor (hydraulic turbines) A governor in which the control signal is proportional to speed error and the stabilizing signals are developed electrically, summed by appropriate electrical networks, and are then hydraulically amplified. Electrical signals may be derived by analog or digital means. (PE/EDPG) 125-1988r

electric hygrometer An instrument for indicating by electric means the humidity of the ambient atmosphere. *Note:* Electric hygrometers usually depend for their operation on the relation between the electric conductance of a film of hygroscopic material and its moisture content. *See also:* instrument. (EEC/PE) [119]

electric incline railway A railway consisting of an electric hoist operating a single car with or without counterweights, or two cars in balance, which car or cars travel on inclined tracks. *See also:* elevator. (EEC/PE) [119]

electric indication lock An electric lock connected to a lever of an interlocking machine to prevent the release of the level or latch until the signals, switches, or other units operated, or directly affected by such lever, are in the proper position. *See also:* interlocking. (EEC/PE) [119]

electric indication locking Electric locking adapted to prevent manipulation of levers that would bring about an unsafe condition for a train movement in case a signal, switch, or other operated unit fails to make a movement corresponding with that of its controlling lever; or adapted directly to prevent the operation of one unit in case another unit to be operated first, fails to make the required movement. *See also:* interlocking. (EEC/PE) [119]

electric induction *See:* electric field induction.

electric interlocking machine An interlocking machine designed for the control of electrically operated functions. *See also:* interlocking. (EEC/PE) [119]

electricity meter A device that measures and registers the integral of an electrical quantity with respect to time. (ELM) C12.1-1988

electric larry car A burden-bearing car for operation on track rails used for short movements of materials, the propulsion of which is effected by electric motors mounted on the vehicle. *Note:* A prefix (diesel-electric, gas-electric, etc.) may replace the word "electric." *See also:* electric motor car. (EEC/PE) [119]

electric loading (rotating machinery) The average ampere-conductors of the primary winding per unit length of the air-gap periphery. *See also:* stator; rotor. (PE) [9]

electric lock A device to prevent or restrict the movement of a lever, a switch, or a movable bridge unless the locking member is withdrawn by an electric device such as an electromagnet, solenoid, or motor. *See also:* interlocking. (CAS) 156-1960w

electric locking The combination of one or more electric locks and controlling circuits by means of which levers of an interlocking machine, or switches, or other units operated in connection with signaling and interlocking, are secured against operation under certain conditions, as follows:

1) Approach locking
2) Indication locking
3) Switch-lever locking
4) Time locking
5) Traffic locking

See also: interlocking. (EEC/PE) [119]

electric locomotive A vehicle on wheels, designed to operate on a railway for haulage purposes only, the propulsion of which is effected by electric motors mounted on the vehicle. *Note:* While this is a generic term covering any type of locomotive driven by electric motors, it is usually applied to locomotives receiving electric power from a source external to the locomotive. The prefix electric may also be applied to cars, buses, etc., driven by electric motors. A prefix (i.e.,

diesel-electric, etc.) may replace the word "electric." (EEC/PE) [119]

electric machine An electric apparatus depending on electromagnetic induction for its operation and having one or more component members capable of rotary and/or linear movement. *See also:* asynchronous machine. (PE) [9]

electric-machine regulating system (rotating machinery) A feedback control system that includes one or more electric machines and the associated control. (PE) [9]

electric-machine regulator (rotating machinery) A specified element or a group of elements that is used within an electric-machine regulating system to perform a regulating function by acting to maintain a designated variable (or variables) at a predetermined value, or to vary it according to a predetermined plan. (PE) [9]

electric mechanism (demand meter) That portion, the action of which, in response to the electric quantity to be measured, gives a measurement of that quantity. *Note:* For example, the electric mechanism of certain demand meters is similar to the ordinary ammeter of wattmeter of the deflection type; in others it is a watt-hour meter or other integrating meter; and in still others it comprises an electric circuit that heats temperature-responsive elements, such as bimetallic spirals, that deflect to move the indicating means. The electrical quantity may be measured in kilowatts, kilowatt-hours, kilovolt-amperes, kilovolt-ampere-hours, amperes, ampere-hours, kilovars, kilovar-hours, or other suitable units. *See also:* demand meter. (EEC/PE) [119]

electric mine locomotive (1) (general) An electric locomotive designed for use underground; for example, in such places as coal, metal, gypsum, and salt mines, tunnels, and in subway construction.

(2) (storage-battery type) An electric locomotive that receives its power supply from a storage battery mounted on the chassis of the locomotive.

(3) (trolley type) An electric locomotive that receives its power supply from a trolley-wire distribution system.

(4) (combination type) An electric locomotive that receives power either from a trolley-wire distribution system or from a storage battery carried on the locomotive.

(5) (separate tandem) An electric mine locomotive consisting of two locomotive units that can be coupled together or operated from one controller as a single unit, or else separated and operated as two independent units.

(6) (permanent tandem) A locomotive consisting of two locomotive units permanently connected together and provided with one set of controls so that both units can be operated by a single operator. (EEC/PE) [119]

electric motive power unit A self-contained electric traction unit, comprising wheels and a superstructure capable of independent propulsion from a power supply system, but not necessarily equipped with an independent control system. *Note:* While this is a generic term covering any type of motive power driven by electric motors, it is usually applied to locomotives receiving electric power from an external source. A prefix (diesel-electric, gas-electric, turbine-electric, etc.) may replace the word "electric." *See also:* electric locomotive. (EEC/PE) [119]

electric motor (1) (packaging machinery) A device that converts electrical energy into rotating mechanical energy. (IA/PKG) 333-1980w

(2) A machine that transforms electric power into mechanical power. (IA/MT) 45-1998

electric motor car A vehicle for operating on track rails, used for the transport of passengers or materials, the propulsion of which is effected by electric motors, mounted on the vehicle. *Note:* A prefix (diesel-electric, gas-electric, etc.) may replace the word "electric." (EEC/PE) [119]

electric motor controller A device or group of devices that serve to govern, in some predetermined manner, the electric power delivered to the motor. *Note:* An electric motor controller is distinct functionally from a simple disconnecting means whose principal purpose in a motor circuit is to disconnect the circuit, together with the motor and its controller, from the source of power. *See also:* electric controller. (IA/IAC) [60]

electric movable-bridge (drawbridge) lock A device used to prevent the operation of a movable bridge until the device is released. *See also:* interlocking. (EEC/PE) [119]

electric network *See:* network.

electric noise (1) (general) Unwanted electrical energy other than crosstalk present in a transmission system.

(2) (interface terminology) A form of interference introduced into a signal system by natural sources that constitutes for that system an irreducible limit on its signal-resolving capability. *Note:* Noise is characterized by randomness of amplitude and frequency distribution and therefore cannot be eliminated by band-rejection filters tuned to preselected frequencies. *See also:* distortion; interference. (PE/AP/ANT) [9], 145-1983s

electric operation Power operation by electric energy. (SWG/PE) C37.100-1981s

electric orchestra lift An electrically driven mechanism for raising and lowering the musicians' platform and the musicians. *See also:* elevator. (EEC/PE) [119]

electric parachute-flare-launching tube A tube mounted on an aircraft through which a metal container carrying a parachute flare is launched, the tube being so designed that as the parachute-flare container passes through the tube, an electric circuit is completed that ignites a slow-burning fuse in the container, the fuse being so designed as to permit the container to clear the aircraft before it ignites the parachute flare. (EEC/PE) [119]

electric passenger locomotive An electric locomotive, commonly used for hauling passenger trains and generally designed to operate at higher speeds and lower tractive-force values than a freight locomotive of equal horsepower capacity. *Note:* A prefix diesel-electric, gas-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

electric penetration assembly (electric penetration assemblies) An assembly of insulated electric conductors, conductor seals, module seals (if any), and aperture seals that provides the passage of the electric conductors through a single aperture in the nuclear containment structure, while providing a pressure barrier between the inside and the outside of the containment structure. The electric penetration assembly includes terminal (junction) boxes, terminal blocks, connectors and cable supports, and splices which are designed and furnished as an integral part of the assembly. (PE/NP) 317-1983r

electric permissible mine locomotive An electric locomotive carrying the official approval plate of the United States Bureau of Mines. *See also:* electric mine locomotive. (EEC/PE) [119]

electric pin-and-socket coupler (connector) A readily disconnective assembly used to connect electric circuits between components of an aircraft electric system by means of mating pins and sockets. (PE/EEC) [119]

electric pipe heating system (electric pipe heating systems) A system of components and devices consisting of electric heaters, controllers, sensors, dedicated power system components such as transformers, panelboards, cables and systems alarm devices (as required), which, when taken together as a system, is used to increase or maintain the temperature of fluids in mechanical pipes, valves, pumps, tanks, instrumentation, etc. (PE/EDPG) 622-1979s

electric polarizability Of an isotropic medium for which the direction of electric polarization and electric field strength are the same at any point in the medium, the magnitude P of the electric polarization at that point divided by the electric field strength there, **E**. *Note:* In a rationalized system, the electric polarizability $P_e = P/\mathbf{E} = \varepsilon_0(\varepsilon - 1)$. (Std100) 270-1966w

electric polarization (electric field) At any point, the vector difference between the electric flux density at that point and

the electric flux density that would exist at that point for the same electric field strength there, if the medium were a vacuum there. *Note:* Electric polarization is the vector limit of the quotient of the vector sum of electric dipole moments in a small volume surrounding a given point, and this volume, as the volume approaches zero in a microscopic sense. (Std100) 270-1966w

electric port (optoelectronic device) A port where the energy is electric. *Note:* A designated pair of terminals may serve as one or more electric ports. *See also:* optoelectronic device. (ED) [46]

electric potential The potential difference between the point and some equipotential surface, usually the surface of the earth, which is arbitrarily chosen as having zero potential (remote earth). *Note:* A point which has a higher potential than a zero surface is said to have a positive potential; one having a lower potential has a negative potential. (PE/PSIM) 81-1983

electric potential difference The line integral of the scalar product of the electric field strength vector and the unit vector along any path from one point to the other, in an electric field resulting from a static distribution of electric charge. (T&D/PE) 539-1990

electric power cable shielding The practice of confining the electric field of the cable to the insulation surrounding the conductor by means of conducting or semiconducting layers, or both, that are in intimate contact or bonded to the inner and outer surfaces of the insulation. (IA/PSE) 241-1990r

electric power distribution panel A metallic or nonmetallic, open or enclosed, unit of an electric system. The operable and the indicating components of an electric system, such as switches, circuit breakers, fuses, indicators, etc., usually are mounted on the face of the panel. Other components, such as terminal strips, relays, capacitors, etc., usually are mounted behind the panel. (EEC/PE) [119]

electric propulsion apparatus Electric apparatus (generators, motors, control apparatus, etc.) provided primarily for ship's propulsion. *Note:* For certain applications, and under certain conditions, auxiliary power may be supplied by propulsion apparatus. *See also:* electric propulsion system. (EEC/PE) [119]

electric propulsion system A system providing transmission of power by electric means from a prime mover to a propeller shaft with provision for control, partly or wholly by electric means, of speed and direction. *Note:* An electric coupling (which see) does not provide electric propulsion. (EEC/PE) [119]

electric rate schedule (electric power supply) A statement of an electric rate (charges) and the terms and conditions governing its application. *Synonym:* electric rate tariff. (PE/PSE) 858-1993w, 346-1973w

electric reset relay (1) A relay that is so constructed that it remains in the picked-up condition even after the input quantity is removed: an independent electric input is required to reset the relay. (SWG/PE/PSR) C37.100-1981s, [6], [56]
(2) A relay that may be reset electrically after an operation. (EEC/REE) [87]

electric resistance-type temperature indicator A device that indicates temperature by means of a resistance bridge circuit. (EEC/PE) [119]

electric road locomotive An electric locomotive designed primarily for hauling dispatched trains over the main or secondary lines of a railroad. *Note:* A prefix diesel-electric, gas-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

electric road-transfer locomotive An electric locomotive designed primarily so that it may be used either for hauling dispatched trains over the main or secondary lines of a railroad or for transferring relatively heavy cuts of cars for short distances within a switching area. *Note:* A prefix diesel-electric, gas-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

electric shock Stimulation of the nerves and possible convulsive contraction of the muscle caused by the passage of an electric current through the human or the animal body. (T&D/PE) 539-1990

electric sign A fixed, stationary, or portable self-contained, electrically illuminated utilization equipment with words or symbols designed to convey information or attract attention. (NESC/NEC) [86]

electric-signal storage tube A storage tube into which the information is introduced as an electric signal and read at a later time as an electric signal. *See also:* storage tube. (ED) 158-1962w

electric sounding machine A motor-driven reel with wire line and weight for determination of depth of water by mechanical sounding. (EEC/PE) [119]

electric squib A device similar to an electric blasting cap but containing a gunpowder composition that simply ignites but does not detonate an explosive charge. *See also:* blasting unit. (EEC/PE) [119]

electric stage lift An electrically driven mechanism for raising and lowering various sections of a stage. (EEC/PE) [119]

electric storage subsystem (terrestrial photovoltaic power systems) The subsystem that stores electric energy. *See also:* array control. (PV) 928-1986r

electric strength (rotating machinery) (dielectric strength) The maximum potential gradient that the material can withstand without rupture. (PE/EM) 95-1977r

electric stroboscope An instrument for observing rotating or vibrating objects or for measuring rotational speed or vibration frequency, or similar periodic quantities, by electrically produced periodic changes in illumination. *See also:* instrument. (EEC/PE) [119]

electric submersible pump (electric submersible pump cable) Deep-well electric submersible pumps as commonly used to lift fluids from subsurface formations. (IA/PC) 1017-1985s

electric submersible pump cable Three-conductor power cable installed in the well for the purpose of transmitting power from the surface to the motor lead extension cable. (IA/PC) 1017-1985s

electric-supply equipment Equipment that produces, modifies, regulates, controls, or safeguards a supply of electric energy. *Synonym:* supply equipment. (PE/SUB/NESC) 1268-1997, C2-1997, 1119-1988w

electric supply lines Those conductors used to transmit electric energy and their necessary supporting or containing structures. Signal lines of more than 400 V are always supply lines within the meaning of the rules, and those of less than 400 V may be considered as supply lines, if so run and operated throughout. *Synonym:* supply lines. (NESC/T&D) C2-1997, C2.2-1960

electric supply station (1) Any building, room, or separate space within which electric supply equipment is located and the interior of which is accessible, as a rule, only to qualified persons. This includes generating stations and substations, including their associated generator, storage battery, transformer, and switchgear rooms or enclosures, but does not include facilities such as pad-mounted equipment and installations in manholes and vaults. (NESC) C2-1997
(2) Any building, room, or separate space within which electric-supply equipment is located and the interior of which is accessible, as a rule, only to properly qualified persons. This includes generating stations and substations, including their associated generator, storage battery, transformer, and switchgear rooms. (PE/SUB) 1268-1997
(3) Any building, room, or separate space within which electric-supply equipment is located and the interior of which is accessible, as a rule, only to properly qualified persons. This includes generating stations, substations and generator, storage battery, and transformer rooms. (SUB/PE) 1119-1988w

electric surges (nuclear power generating station) Any spurious voltage or current pulses conducted into the module from external sources. (PE/NP) 381-1977w

electric susceptibility Of an isotropic medium, for which the direction of electric polarization and electric field strength are the same, at any point in the medium, the magnitude of the electric polarization at that point of the medium, divided by the electric flux density that would exist at that point for the same electric field strength, if the medium there were a vacuum. *Note:* In a rationalized system the electric susceptibility $\chi_\varepsilon = P/D(\varepsilon - 1)$. (Std100) 270-1966w

electric switching locomotive An electric locomotive designed for yard movements of freight or passenger cars, its speed and continuous electrical capacity usually being relatively low. *Note:* A prefix diesel-electric, gas-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

electric switch-lever lock An electric lock used to prevent the movement of a switch lever or latch in an interlocking machine until the lock is released. *See also:* interlocking. (EEC/PE) [119]

electric switch-lever locking A general term for route or section locking. *See also:* interlocking. (EEC/PE) [119]

electric switch lock An electric lock used to prevent the operation of a switch or a switch movement until the lock is released. *See also:* interlocking. (EEC/PE) [119]

electric system loss (1) Total electric energy losses in the electric system. It consists of transmission, transformer, and distribution losses between the supply and receiving points. (PE/PSE) 858-1993w

(2) Total electric energy loss in the electric system. It consists of transmission, transformation, and distribution losses between sources of supply and points of delivery. (PE/PSE) 346-1973w

electric tachometer (marine usage) An instrument for measuring rotational speed by electric means. *See also:* instrument. (EEC/PE) [119]

electric telegraph A telegraph having the relationship of the moving parts of the transmitter and receiver maintained by the use of self-synchronous motors or equivalent devices. (EEC/PE) [119]

electric telemeter The measuring, transmitting, and receiving apparatus, including the primary detector, intermediate means (excluding the channel) and end devices for electric telemetering. *Note:* A telemeter that measures current is called a teleammeter; voltage, a televoltmeter; power, a telewattmeter; one that measures angular or linear position, a position telemeter. The names of the various component parts making up the telemeter are, in general, self-defining; for example, the transmitter, receiver, indicator, etc. (SWG/PE) C37.100-1992

electric telemetering (electric telemetry) Telemetering performed by an electrical translating means separate from the measured. (SWG/PE) C37.100-1992

electric thermometer (rotating electric machinery) An instrument that utilizes electric means to measure temperature. Electric thermometers include thermocouples and resistance temperature detectors. (PE/EM) 11-1980r

electric tower car A rail vehicle, the propulsion of which is effected by electric means and that is provided with an elevated platform, generally arranged to be raised and lowered, for the installation, inspection, and repair of a contact wire system. *Note:* A prefix diesel-electric, gas-electric, etc., may replace the word electric. *See also:* electric motor car. (EEC/PE) [119]

electric trail car (electric trailer) A car not provided with motive power that is used in a train with one or more electric motor cars. *Note:* A prefix diesel-electric, gas-electric, etc., may replace the word electric to identify the motor cars. *See also:* electric motor car. (EEC/PE) [119]

electric transducer A transducer in which all of the waves concerned are electric. *See also:* transducer. (Std100) 196-1952w, 270-1966w

electric transfer locomotive An electric locomotive designed primarily for transferring relatively heavy cuts of cars for short distances within a switching area. *Note:* A prefix diesel-electric, gas-electric, turbine-electric, etc., may replace the word electric. *See also:* electric locomotive. (EEC/PE) [119]

electric-tuned oscillator An oscillator whose frequency is determined by the value of a voltage, current, or power. Electric tuning includes electronic tuning, electrically activated thermal tuning, electromechanical tuning, and tuning methods in which the properties of the medium in a resonant cavity are changed by an external electric means. An example is the tuning of a ferrite-filled cavity by changing an external magnetic field. (ED) [45], 158-1962w

electric turn-and-bank indicator A device that utilizes an electrically driven gyro for turn determination and a gravity-actuated inclinometer for bank determination. (EEC/PE) [119]

electric valve operator (nuclear power generating station) An electric-powered mechanism for opening and closing a valve, including all electric and mechanical components that are integral to the mechanism and are required to operate and control valve action. (PE/NP) 380-1975w, 382-1980s

electric vector *See:* electric field vector.

electric wind *See:* convective discharge.

electrification by friction *See:* triboelectrification.

electrification time (cable-insulation materials) Time during which a steady direct voltage is applied to electrical insulating materials before the current is measured. (PE) 402-1974w

electrified track A railroad track suitably equipped in association with a contact conductor or conductors for the operation of electrically propelled vehicles that receive electric power from a source external to the vehicle. *See also:* electric locomotive. (EEC/PE) [119]

electroacoustical reciprocity theorem For an electroacoustic transducer satisfying the reciprocity principle, the quotient of the magnitude of the ratio of the open-circuit voltage at output terminals (or the short-circuit current) of the transducer, when used as a sound receiver, to the free-field sound pressure referred to an arbitrarily selected reference point on or near the transducer, divided by the magnitude of the ratio of the sound pressure apparent at a distance d from the reference point to the current flowing at the transducer input terminals (or the voltage applied at the input terminals), when used as a sound emitter, is a constant, called the reciprocity constant, independent of the type or constructional details of the transducer. *Note:* The reciprocity constant is given by

$$\left|\frac{M_O}{S_S}\right| = \left|\frac{M_S}{S_S}\right| = \left|\frac{2\delta}{\rho f}\right|$$

where

M_O = open free-field voltage response, as a sound receiver, in open-circuit volts per newton per square meter, referred to the arbitrary reference point on or near the transducer.

M_S = free-field current response in short-circuit amperes per newton per square meter, referred to the arbitrary reference point on or near the transducer

S_O = sound pressure in newtons per square meter per ampere of input current produced at a distance d meters from the arbitrary reference point

S_S = sound pressure in newtons per square meter per volt applied at the input terminals produced at a distance d meters from the arbitrary reference point

f = frequency in hertz

ρ = density of the medium in kilograms per cubic meter

δ = distance in meters from the arbitrary reference point on or near the transducer to the point in which the sound pressure established by the transducer when emitting is evaluated.

(SP) [32]

electroacoustic transducer (electric systems) A transducer for receiving waves and delivering waves to an acoustic system, or vice versa. *See also:* transducer. (SP) [32]

electrobiology The study of electrical phenomena in relation to biological systems. (EMB) [47]

electrocardiogram The graphic record of the variation with time of the voltage associated with cardiac activity. *See also:* spindle wave; electrodermogram; vector electrocardiogram; electrocorticogram. (EMB) [47]

electrocardiographic waves, P, Q, R, S, and, T (medical electronics) (in electrocardiograms obtained from differential electrodes placed on the right arm and left leg) The characteristic tracing consists of five consecutive waves: P, a prolonged, low, positive wave; Q, brief, low, negative; R, brief, high, positive; S, brief, low, negative; and T, prolonged, low, positive. (EMB) [47]

electrocautery (electrotherapy) An instrument for cauterizing the tissues by means of a conductor brought to a high temperature by an electric current. *See also:* electrotherapy. (EMB) [47]

electrochemical cell A system consisting of an anode, cathode, and an electrolyte plus such connections (electric and mechanical) as may be needed to allow the cell to deliver or receive electric energy. (AES/IA/APP) [41], [73]

electrochemical equivalent: element, compound, radical, or ion (1) (general) The weight of that substance involved in a specified electrochemical reaction during the passage of a specified quantity of electricity, such as a faraday, amperehour, or coulomb. (EEC/PE) [119]
(2) (oxidation) The weight of an element or group of elements oxidized or reduced at 100% efficiency by a unit quantity of electricity. *See also:* electrochemistry. (IA) [59]

electrochemical recording (facsimile) Recording by means of a chemical reaction brought about by the passage of signal-controlled current through the sensitized portion of the record sheet. *See also:* recording. (COM) 168-1956w

electrochemical series *See:* electromotive force series.

electrochemical valve An electric valve consisting of a metal in contact with a solution or compound across the boundary of which current flows more readily in one direction than in the other direction and in which the valve action is accompanied by chemical changes. (EEC/PE) [119]

electrochemical valve metal A metal or alloy having properties suitable for use in an electrochemical valve. *See also:* electrochemical valve. (EEC/PE) [119]

electrochemistry That branch of science and technology that deals with interrelated transformations of chemical and electric energy. (EEC/PE) [119]

electrochromeric display device A display device that uses materials that change from transparent to opaque under the control of an electric field. For example, a liquid crystal display device. (C) 610.10-1994w

electrocoagulation (medical electronics) The clotting of tissue by heat generated within the tissue by impressed electric currents. (EMB) [47]

electrocorticogram (medical electronics) A graphic record of the variation with time of voltage taken from exposed cortex cerebra. (EMB) [47]

electroculture (medical electronics) The stimulation of growth, flowering, or seeding by electric means. (EMB) [47]

electrocution The destruction of life by means of electric current. (EMB) [47]

electrode (1) (electrochemistry) An electric conductor for the transfer of charge between the external circuit and the electroactive species in the electrolyte. *Note:* Specifically, in an electrolytic cell, an electrode is a conductor at the surface of which a change occurs from conduction by electrons to conduction by ions or colloidal ions. *See also:* electrolytic cell; electrochemical cell. (AES) [41]
(2) (electron tube) A conducting element that performs one or more of the functions of emitting, collecting, or controlling by an electric field the movements of electrons or ions. (ED) 161-1971w
(3) (A) (biological electronics) (reference, inactive, diffuse, dispersive, indifferent electrode) A pickup electrode that, because of averaging, shunting, or other aspects of the tissue-current pattern to which it connects, shows potentials not characteristic of the region near the active electrode. **(B) (biological electronics) (reference, inactive, diffuse, dispersive, indifferent electrode)** Any electrode, in a system of stimulating electrodes, at which due to its dispersive action, excitation is not produced. **(C) (biological electronics) (reference, inactive, diffuse, dispersive, indifferent electrode)** An electrode of relatively large area applied to some inexcitable or distant tissue in order to complete the circuit with the active electrode that is used for stimulation. (EMB) [47]

electrode, accelerating *See:* accelerating electrode.

electrode admittance (*j*th electrode of an *n*-electrode electron tube) The short-circuit driving-point admittance between the jth electrode and the reference point measured directly at the jth electrode. *Note:* To be able to determine the intrinsic electronic merit of an electron tube, the driving-point and transfer admittances must be defined as if measured directly at the electrodes inside the tube. The definitions of electrode admittance and electrode impedance are included for this reason. *See also:* electron-tube admittances. (ED) 161-1971w

electrode alternating-current resistance The real component of the electrode impedance. *See also:* self-impedance. (ED) [45]

electrode bias (electron tube) The voltage at which an electrode is stabilized under operating conditions with no incoming signal, but taking into account the voltage drops in the connected circuits. *See also:* electrode voltage. (Std100) [84]

electrode capacitance (*n*-terminal electron tube) The capacitance determined from the short-circuit driving-point admittance at that electrode. *See also:* electron-tube admittances. (ED) 161-1971w

electrode characteristic A relation, usually shown by a graph, between the electrode voltage and the current of an electrode, all other electrode voltages being maintained constant. (ED) 161-1971w

electrode conductance The real part of the electrode admittance. (ED) 161-1971w

electrode, control *See:* control electrode.

electrode current (electron tube) The current passing to or from an electrode through the interelectrode space. *Note:* The terms cathode current, grid current, anode current, plate current, etc., are used to designate electrode currents for these specific electrodes. Unless otherwise stated, an electrode current is measured at the available terminal. (ED) [45]

electrode current, average *See:* average electrode current.

electrode-current averaging time (electron tube) The time interval over which the current is averaged in defining the operating capabilities of the electrode. *See also:* electrode current. (ED) [45]

electrode dark current (1) (phototubes) The component of electrode current remaining when ionizing radiation and optical photons are absent. *Notes:* 1. Optical photons are photons with energies corresponding to wavelengths between 2000 and 1500 angstroms. 2. Since the dark current may change considerably with temperature, the temperature should be specified. *See also:* phototube. (ED) [45]
(2) (camera tubes) The current from an electrode in a photoelectric tube under stated conditions of radiation shielding. *See also:* camera tube. (BT/ED/AV) [34], [45]

electrode dissipation The power dissipated in the form of heat by an electrode as a result of electron or ion bombardment, or both, and radiation from other electrodes. *See also:* grid driving power. (ED) [45]

electrode drop (arc-welding apparatus) The voltage drop in the electrode due to its resistance (or impedance). (EEC/AWM) [91]

electrode impedance The reciprocal of the electrode admittance. *See also:* electron-tube admittances. (ED) [45]

electrode impedance, biological *See:* biological electrode impedance.

electrode, pad *See:* pad electrode.

electrode potential, biological *See:* biological electrode potential.

electrode radiator (electron tube) (cooling fin) A metallic piece, often of large area, extending the electrode to facilitate the dissipation of the heat generated in the electrode. *See also:* electron tube. (ED) [45], [84]

electrode reactance The imaginary component of the electrode impedance. *See also:* self-impedance. (ED) [45]

electrode resistance (1) (general) The reciprocal of the electrode conductance. *Note:* This is the effective parallel resistance and is not the real component of the electrode impedance. (ED) [45]

(2) (at a stated operating point) The quotient of the direct electrode voltage by the direct electrode current. *See also:* self-impedance. (ED) [45]

electrodermal reaction (EDR) (medical electronics) The change in electric resistance of the skin during emotional stress. (EMB) [47]

electrodermogram (electromyogram) (electrobiology) (electroretinogram) A graphic record of the variation with time of voltage taken from the given and anatomical structure (skin, muscle, and retina, respectively). *See also:* electrocardiogram. (EMB) [47]

electrodesiccation (fulguration) The superficial destruction of tissue by electric sparks from a movable electrode. *See also:* electrotherapy. (EMB) [47]

electrode, signal *See:* signal electrode.

electrode susceptance The imaginary component of the electrode admittance. *See also:* self-impedance. (ED) [45]

electrode voltage The voltage between an electrode and the cathode or a specified point of a filamentary cathode. *Note:* The terms grid voltage, anode voltage, plate voltage, etc., are used to designate the voltage between these specific electrodes and the cathode. Unless otherwise stated, electrode voltages are understood to be measured at the available terminals. (ED) [45], 161-1971w

electrodiagnosis The study of functional states of parts of the body either by studying their responses to electric stimulation or by studying the electric potentials (or currents) that they spontaneously produce. (EMB) [47]

electroencephalogram (medical electronics) A graphic record of the changes with time of the voltage obtained by means of electrodes applied to the scalp over the cerebrum. (EMB) [47]

electroendosmosis effect A phenomenon occasionally observed, more often on older windings, when, in the presence of moisture, different insulation resistance values may be obtained when the polarity of the tester leads are reversed. Typically for older wet windings, the insulation resistance for reverse polarity, where the ground lead is connected to the winding and the negative voltage lead to ground, is much higher than for normal polarity. (PE/EM) 43-2000

electrographic recording (electrostatography) The branch of electrostatic electrography that employs a charge transfer between two or more electrodes to form directly electrostatic-charge patterns on an insulating medium for producing a viewable record. *See also:* electrostatography. (ED) [46]

electrographitic brush (rotating machinery) A brush composed of selected amorphous carbon that, in the process of manufacturer, is carried to a temperature high enough to convert the carbon to the graphitized form. *Note:* This type of brush is exceedingly versatile in that it can be made soft or very hard, also nonabrasive or slightly abrasive. Grades of brushes of this type have a high current-carrying capacity, but differ greatly in operating speed from low to high. *See also:* brush. (PE) [9]

electrohydraulic elevator A direct-plunger elevator where liquid is pumped under pressure directly into the cylinder by a pump driven by an electric motor. *See also:* elevator. (EEC/PE) [119]

electrokinetic potential (zeta potential) (medical electronics) A set of four electric or velocity potentials that accompany relative motion between solids and liquids. (EMB) [47]

electroluminescence (1) (illuminating engineering) The emission of light from a phosphor excited by an electromagnetic field. (EEC/IE) [126]

(2) (light-emitting diodes) The emission of light from a material (phosphor or semiconductor) where the exciting mechanism is the application of an electromagnetic field. (ED) [127]

(3) (fiber optics) Nonthermal conversion of electrical energy into light. One example is the photon emission resulting from electron-hole recombination in a pn junction such as in a light emitting diode. *See also:* injection laser diode. (Std100) 812-1984w

electroluminescent display device An optoelectronic device with a multiplicity of electric ports, each capable of independently producing an optic output from an associated electroluminator element. *See also:* optoelectronic device. (ED) [46]

electroluminescent display panel A thin, usually flat, electroluminescent display device. *See also:* optoelectronic device. (ED) [46]

electrolysis (underground structures) The destructive chemical action caused by stray or local electric currents to pipes, cables, and other metalwork. *See also:* corrosion. (T&D/PE) [10]

electrolyte A conducting medium in which the flow of electric current takes place by migration of ions. *Note:* Many physical chemists define electrolyte as a substance that when dissolved in a specified solvent, usually water, produces an ionically conducting solution. *See also:* electrolytic cell. (Std100) 270-1966w

electrolyte cells *See:* cascade.

electrolytic *See:* cathode.

electrolytic cell (1) A receptacle or vessel in which electrochemical reactions are caused by applying electrical energy for the purpose of refining or producing usable materials. (NESC/NEC) [86]

(2) A receptacle or vessel in which electrochemical reactions are caused by applying electrical energy for the purpose of refining or producing materials. (IA/PC) 463-1993w

electrolytic cell line working zone The cell line working zone is the space envelope wherein operation or maintenance is normally performed on or in the vicinity of exposed energized surfaces of electrolytic cell lines or their attachments. (NESC/NEC) [86]

electrolytic cleaning The process of degreasing or descaling a metal by making it an electrode in a suitable bath. (Std100) [71]

electrolytic recording (facsimile) That type of electrochemical recording in which the chemical change is made possible by the presence of an electrolyte. *See also:* recording. (COM) 168-1956w

electrolytic tank A vessel containing a poorly conducting liquid, in which are inserted conductors that are scale models of an electrode system. *Note:* It is used to obtain potential diagrams. *See also:* electron optics. (ED) [45], [84]

electrolyzer An electrolytic cell for the production of chemical products.

electromagnet A device consisting of a ferromagnetic core and a coil, that produces appreciable magnetic effects only when an electric current exists in the coil. 270-1966w

electromagnetic compatibility (EMC) (1) (supervisory control, data acquisition, and automatic control) (station con-

trol and data acquisition) A measure of equipment tolerance to external electromagnetic fields.
(SWG/PE/SUB) C37.100-1992, C37.1-1994
(2) (control of system electromagnetic compatibility) The ability of a device, equipment, or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.
(EMC/EMB/MIB) C63.12-1987, 1073.3.2-2000
(3) (equipment) The capability of electronic equipment or systems to be operated in the intended operational electromagnetic environment at designed levels of efficiency.
(PE/EDPG) 1050-1996
(4) (of an electrical system) An electrical system's ability to perform its specified functions in the presence of electrical noise generated either internally or externally by other systems. The goal of EMC is to minimize the influence of electrical noise. (PE/IC) 1143-1994r
(5) The requirements for electromagnetic emission and susceptibility dictated by the physical environment and regulatory governing bodies within whose jurisdiction a piece of equipment is operated. (EMB/MIB) 1073.4.1-2000

electromagnetic delay line (computers) (information processing) A delay line whose operation is based on the time of propagation of electromagnetic waves through distributed or lumped capacitance and inductance. *Synonym:* electric delay line. (C) [20], [85], 610.10-1994w

electromagnetic disturbance (1) An electromagnetic phenomenon that may be superimposed on a wanted signal. *See also:* electromagnetic compatibility. (EMC) [53]
(2) (overhead power lines) Any electromagnetic phenomenon that may degrade the performance of a device, a piece of equipment, or a system. *Notes:* 1. An electromagnetic disturbance may be electromagnetic noise, an unwanted signal, or a change in the propagation medium itself. 2. The term "system" is used here in its generic sense, which may include inert and living matter. (T&D/PE) 539-1990

electromagnetic environment The electromagnetic field(s) and or signals existing in a transmission medium. *See also:* electromagnetic compatibility . [53]

electromagnetic field (1) The energy field radiating from a source and containing both electric and magnetic field components. *See also:* magnetic field; electric field.
(PE/IC) 1143-1994r
(2) A time-varying field, associated with the electric or magnetic forces and described by Maxwell's equations.
(AP/PROP) 211-1997

electromagnetic field induction (1) (electro-magnetic coupling) The induction process that includes both electric and magnetic fields. (T&D/PE) 1048-1990
(2) (overhead power lines) (electromagnetic coupling) The induction process that results from time-varying electromagnetic fields. (T&D/PE) 539-1990, 524a-1993r

electromagnetic induction (1) The production of an electromotive force in a circuit by a change in the magnetic flux linking with that circuit. (CHM) [51]
(2) *See also:* electromagnetic interference.
(PE/IC) 1143-1994r

electromagnetic interference (EMI) (1) (station control and data acquisition) A measure of electromagnetic radiation from equipment.
(SWG/PE/SUB) C37.100-1992, C37.1-1994
(2) (overhead power lines) Degradation of the performance of a device, a piece of equipment, or a system caused by an electromagnetic disturbance. *Note:* The English words "interference" and "disturbance" are often used indiscriminately. (T&D/PE) 539-1990
(3) Impairment of a wanted electromagnetic signal by an electromagnetic disturbance.
(PE/IA/EDPG/PSE) 1050-1996, 241-1990r
(4) Electromagnetic energy from sources external or internal to electrical or electronic equipment that adversely affects equipment by creating undesirable responses (degraded performance or malfunctions). EMI can be divided into two classes: continuous wave (CW) and transient. *Synonym:* electromagnetic induction. *See also:* continuous wave; electrical noise; transient electrical noise. (PE/IC) 1143-1994r
(5) Signals emanating from external sources (e.g., power supplies, transmitters) or internal sources (e.g., adjacent electronic components, energy sources) that disrupt or prevent operation of electronic systems.
(EMB/C/BA/MIB) 1073.3.2-2000, 896.3-1993w
(6) Any disturbance that interrupts, obstructs, or otherwise impairs the performance of electronic equipment.
(PEL) 1515-2000

electromagnetic lens A three-dimensional structure, through which electromagnetic waves can pass, possessing an index of refraction that may be a function of position and a shape that is chosen so as to control the exiting aperture illumination. (AP/ANT) 145-1993

electrogeometric model (EGM) A geometrical representation of a facility, that, together with suitable analytical expressions correlating its dimensions to the current of the lightning stroke, is capable of predicting if a lightning stroke will terminate on the shielding system, the earth, or the element of the facility being protected. (SUB/PE) 998-1996

electrogeometric model theory The theory describing the electrogeometric model together with the related quantitative analyses including the correlation between the striking distances to the different elements of the model and the amplitude of the first return stroke. (SUB/PE) 998-1996

electromagnetic noise (1) An unwanted electromagnetic disturbance that is not of a sinusoidal character. *See also:* electromagnetic compatibility. (EMC/INT) [53], [70]
(2) (overhead power lines) A time-varying electromagnetic phenomenon that apparently does not convey information and that may be superimposed on or combined with a wanted signal. (T&D/PE) 539-1990

electromagnetic radiation (1) (radio frequency radiation hazard warning symbol) The term is restricted to that part of the spectrum commonly defined as the radio frequency region, which for the purpose of this sxtandard includes microwave frequencies. (NIR) C95.2-1982r
(2) The emission of electromagnetic energy from a finite region in the form of unguided waves. (AP/ANT) 145-1993
(3) (laser maser) The flow of energy consisting of orthogonally vibrating electric and magnetic fields lying transverse to the direction of propagation. X rays, ultraviolet, visible, infrared, and radio waves occupy various portions of the electromagnetic spectrum and differ only in frequency and wavelength. (LEO) 586-1980w

electromagnetic relay (1) An electromechanical relay that operates principally by action of an electromagnetic element that is energized by the input quantity.
(SWG/PE) C37.100-1992
(2) A relay, controlled by electromagnetic means, that opens and closes electric contacts. *See also:* relay.
(EEC/REE) [87]

electromagnetic signal The intelligence, message, or effect to be conveyed over a communication system or broadcasting system via electromagnetic waves. (T&D/PE) 539-1990

electromagnetic spectrum The spectrum of electromagnetic radiation, as shown in the following table:

Spectral region	Wavelength
Gamma rays	< 0.006 nm
X-rays	0.006–5 nm
Ultraviolet rays	5 nm–0.4 μm
Visible light	0.4–0.7 μm
Infrared	0.7 μm–0.1 mm
Radio	> 0.1 mm

See also: radio spectrum. (AP/PROP) 211-1997

electromagnetic pulse (EMP) (1) A high-energy electromagnetic pulse initiated by a nuclear reaction (e.g., upper atmospheric detonation of a nuclear weapon).
(PE/IC) 1143-1994r

(2) An intense transient electromagnetic field. *Note:* EMP is commonly associated with nuclear explosions in or near the Earth's atmosphere; however, electromagnetic pulses can arise from other sources, such as lightning. (AP/PROP) 211-1997

electromagnetic waves (1) Waves characterized by variations of electric and magnetic fields. *Note:* Electromagnetic waves are known as radio waves, heat rays, light rays, etc., depending on the frequency. *See also:* radio wave; propagation; waveguide. (MTT) 146-1980w

(2) Waves characterized by temporal and spatial variations of electric and magnetic fields. Electromagnetic waves are known as radio waves, infrared waves, light waves, etc., depending on the frequency. (AP/PROP) 211-1997

electromechanical device (control equipment) A device that is electrically operated and has mechanical motion such as relays, servos, etc. (PE/PSE) 94-1970w

electromechanical recording (facsimile) Recording by means of a signal-actuated mechanical device. *See also:* recording. (COM) 168-1956w

electromechanical relay A relay that operates by physical movement of parts resulting from electromagnetic, electrostatic, or electrothermic forces created by the input quantities. (SWG/PE) C37.100-1992

electromechanical switching system (telephone switching systems) An automatic switching system in which the control functions are performed principally by electromechanical devices. (COM) 312-1977w

electromechanical transducer A transducer for receiving waves from an electric system and delivering waves to a mechanical system, or vice versa. *See also:* transducer. (T&D/PE/SP) 590-1977w, [32]

electromechanical watthour meter designation The maximum continuous load in amperes at which a watthour meter meets the accuracy of ANSI C12.1-1988, or the latest revision thereof. (ELM) C12.10-1987

electrometer tube A vacuum tube having a very low control-electrode conductance to facilitate the measurement of extremely small direct current or voltage. (ED) 161-1971w, [45]

electromotive force *See:* voltage.

electromotive force series A list of elements arranged according to their standard electrode potentials. (IA) [59], [71]

electromyograph (medical electronics) An instrument for recording action potentials or physical movements of muscles. (EMB) [47]

electron (1) An elementary particle containing the smallest negative electric charge. *Note:* The mass of the electron is approximately equal to 1/1837 of the mass of the hydrogen atom. (Std100) [84]

(2) Operated by, containing, or producing electrons. Examples: Electron tube, electron emission, and electron gun. *See also:* electronics; electronic. (EEC/PE) [119]

electron accelerator, linear *See:* linear electron accelerator.

electronarcosis The production of transient insensibility by means of electric current applied to the cranium at intensities insufficient to cause generalized convulsions. *See also:* electrotherapy. (EMB) [47]

electron beam A beam of electrons (ions) emitted from a single source and moving in neighboring paths that are confined to a desired region. (Std100) [84]

electron beam crosstalk (charge-storage tubes) Any spurious output signal that arises from scanning or from the input of information. *See also:* charge-storage tube. (ED) 158-1962w

electron beam recording (EBR) In micrographics, a specific method of producing computer output microfilm in which a beam of electrons is directed onto an energy-sensitive microfilm. (C) 610.2-1987

electron-beam tube An electron tube, the performance of which depends upon the formation and control of one or more electron beams. (ED) 161-1971w

electron collector (microwave tubes) The electrode that receives the electron beam at the end of its path. *Note:* The power of the beam is used to produce some desired effect before it reaches the collector. *See also:* velocity-modulated tube. (Std100) [84]

electron-coupled oscillator An oscillator employing a multigrid tube with the cathode and two grids operating as an oscillator in any conventional manner, and in which the plate circuit load is coupled to the oscillator through the electron system. *See also:* oscillatory circuit. (AP/BT/ANT) 145-1983s, 182-1961w

electron (proton) damage coefficient The change in a stated quantity (such as minority carrier inverse squared diffusion length) of a given material per unit particle fluence of a stated energy spectrum. (AES/SS) 307-1969w

electron device A device in which conduction is principally by electrons moving through a vacuum, gas, or semiconductor. (ED) 161-1971w

electron-device transducer *See:* short-circuit forward admittance.

electron emission The liberation of electrons from an electrode into the surrounding space. *Note:* Quantitatively, it is the rate at which electrons are emitted from an electrode. (ED) 161-1971w

electron gun (1) (electron tube) An electrode structure that produces and may control, focus, deflect, and converge one or more electron beams. *See also:* electrode. (ED) 161-1971w

(2) (computer graphics) A device in a cathode ray tube that emits a stream of electrons that is directed by the deflection system toward the phosphor-coated screen. *See also:* flood gun. (C) 610.6-1991w

electron-gun density multiplication (electron tube) The ratio of the average current density at any specified aperature through which the stream passes to the average current density at the cathode surface. (ED) 161-1971w

electronic Of, or pertaining to, devices, circuits, or systems utilizing electron devices. Examples: Electronic control, electronic equipment, electronic instrument, and electronic circuit. *See also:* electron device; electronics. (ED) 161-1971w

electronically de-spun antenna (communication satellite) A directional antenna, mounted to a rotating object (namely spin stabilized communication satellite), with beam switching and phasing such that the antenna beam points into the same direction in space regardless of its mechanical rotation. (COM) [24]

electronically erasable programmable read-only memory (EEPROM) A type of memory chip designed to be programmed more than once. The chips are functionally the same as EPROMs, but are erased using a particular electrical voltage. (PE/SUB) 1379-1997

electronic analog computer An automatic computing device that operates in terms of continuous variation of some physical quantities, such as electric voltages and currents, mechanical shaft rotations, or displacements, and that is used primarily to solve differential equations. *Note:* The equations governing the variation of the physical quantities have the same or very nearly the same form as the mathematical equations under investigation and therefore yield a solution analogous to the desired solution of the problem. Results are measured on meters, dials, oscillograph recorders, or oscilloscopes. (C) 165-1977w

electronic bulletin board In an electronic mail system, a storage area shared by several users, each having access to all messages left in that area. (C) 610.2-1987

electronic cash register (ECR) A device that functions as both a cash register and a point-of-sale terminal to a central computer performing inventory control, price updating, and other retail sales functions. (C) 610.2-1987

Electronic Circuit Analysis Program II (ECAP II) A simulation language used for modeling and analyzing electrical

networks, allowing synthesis of device models using a function generator. (C) 610.13-1993w

electronic contactor A contactor whose function is performed by electron tubes. *See also:* contactor. (IA/ICTL/IAC) [60]

electronic controller An electric controller in which the major portion or all of the basic functions are performed by electron tubes. (IA/ICTL/IAC) [60]

electronic counter-countermeasures (ECCM) Any electronic technique designed to make a radar less vulnerable to electronic countermeasures (ECM). (AES) 686-1997

electronic counter-countermeasures improvement factor (radar) The power ratio of the electronic countermeasures (ECM) signal level required to produce a given output signal from a receiver using an ECCM technique to the ECM signal level producing the same output from the same receiver without the ECCM technique. (AES/RS) 686-1982s

electronic countermeasures (ECM) Any electronic technique designed to deny detection or accurate information to a radar. *Note:* Screening with noise, confusion with false targets, and deception by affecting tracking circuits are typical ECM. (AES) 686-1997

electronic data processing (EDP) *See:* automatic data processing.

electronic data sheet A data sheet stored in some form of electronically readable memory (as opposed to a piece of paper). (IM/ST) 1451.2-1997

Electronic Design Interchange Format (EDIF) An industry standard for transfer of schematic and structured connectivity information for electronic design automation. (ATLAS) 1232-1995

electronic direct-current motor controller A phase-controlled rectifying system using tubes of the vapor- or gas-filled variety for power conversion to supply the armature circuit or the armature and shunt-field circuits of a direct-current motor, to provide adjustable-speed, adjustable- and regulated-speed characteristics. *See also:* electronic controller. (IA/ICTL/IAC) [60]

electronic direct-current motor drive The combination of an electronic direct-current motor controller with its associated motor or motors. *See also:* electronic controller. (IA/ICTL/IAC) [60]

electronic efficiency (electron tube) The ratio of the power at the desired frequency delivered by the electron stream to the circuit in an oscillator or amplifier to the average power supplied to the stream. (ED) 161-1971w

electronic funds transfer system A data collection and telecommunication system that electronically transports information about the movement of funds between accounts managed by financial institutions. (C) 610.2-1987

electronic gun A device in a cathode ray tube that emits of electrons directed by the deflection system toward the phosphor-coated screen, thereby causing the phosphor to emit light. *See also:* flood gun. (C) 610.10-1994w

electronic keying A method of keying whereby the control is accomplished solely by electronic means. *See also:* telegraphy. (AP/ANT) 145-1983s

electronic line scanning (facsimile) That method of scanning that provides motion of the scanning spot along the scanning line by electronic means. *See also:* scanning. (COM) 168-1956w

electronic mail (A) The generation, transmission, and display of correspondence and documents by electronic means. *Synonym:* mailbox service. *See also:* electronic bulletin board; electronic mailbox. **(B)** The concepts and technologies employed for the electronic communication of textual material. (C) 610.2-1987

(2) (A) A networking service that electronically provides all the basic services of traditional mail. *See also:* mail exploder. **(B)** A computerized store-and-forward system for electronic delivery of text memos and messages. (C) 610.7-1995

electronic mailbox A storage area used to hold all messages addressed to a particular user of an electronic mail system. (C) 610.2-1987

electronic microphone A microphone that depends for its operation on a change in the terminal electrical characteristic of an active device when a force is applied to some part of the device. *See also:* microphone. (SP) [32]

electronic multiplier An all-electronic device capable of forming the product of two variables. *Note:* Examples are a time-division multiplier, a square-law multiplier, an amplitude-modulation-frequency-modulation (AM-FM) multiplier, and a triangular-wave multiplier. *See also:* electronic analog computer. (C) 165-1977w

electronic navigation *See:* navigation.

electronic office An office that makes use of office automation. *Synonyms:* automated office; office of the future. *See also:* paperless office. (C) 610.2-1987

electronic pen A pick device that detects a display element or segment by sensing electronic pulses. (C) 610.10-1994w

electronic position indicator (navigation aid terms) A radio navigation system used in hydrographic surveying that provides circular lines of position. (AES/GCS) 172-1983w

electronic power converter Electronic devices for transforming electric power. *See also:* rectification. (EEC/PE) [119]

electronic raster scanning (facsimile) That method of scanning in which motion of the scanning spot in both dimensions is accomplished by electronic means. *See also:* scanning. (COM) 168-1956w

electronic rectifier A rectifier in which electron tubes are used as rectifying elements. *See also:* rectification of an alternating current; electronic controller. (IA/ICTL/IAC) [60]

electronics (1) Of, or pertaining to, the field of electronics. Examples: Electronics engineer, electronics course, electronics laboratory, and electronics committee. *See also:* electronic; electron.

(2) That field of science and engineering that deals with electron devices and their utilization. *See also:* electron device. (ED) [45]

(3) That branch of science and technology that relates to devices in which conduction is principally by electrons moving through a vacuum, gas, or semiconductor. (IA/MT) 45-1998

electronic scanning Scanning an antenna beam by electronic or electric means without moving parts. *Synonym:* inertialess scanning. *See also:* radiation. (AP/ANT) 145-1993

Electronic Industries Association (EIA) An organization that establishes and maintains standards for the electronics industries in the United States. (C/C) 610.7-1995, 610.10-1994w

electronic signatures The use of encryption techniques to authenticate a message as originating from a specific source, often utilizing a public key system. (C) 610.7-1995

electronic spread sheet (A) A computer program that enables the user to set up a display of rows and columns in which some entries are manually entered and others are calculated automatically using formulas supplied by the user. *Synonym:* spread sheet. **(B)** The display of rows and columns produced by a computer program as in (A). (C) 610.2-1987

electronic storage register (1) (watthour meters) An electronic circuit, which is an integral part of the time-of-use register, where data are stored for display or retrieval, or both. (ELM) C12.13-1985s

(2) (electromechanical watthour meters) An electronic circuit, which is an integral part of the solid-state register, where data are stored for display and/or retrieval. (ELM) C12.15-1990

electronic switching system (1) (telephone switching systems) An automatic switching system in which the control functions are performed principally by electronic devices. (COM) 312-1977w

(2) A type of telephone switching system that uses a special-purpose computer to direct and control the switching operation. *See also:* crossbar system; step-by-step system. (C) 610.7-1995

electronic thermal conductivity The part of the thermal conductivity resulting from the transport of thermal energy by electrons and holes. *See also:* thermoelectric device. (ED) [46]

electronic transformer (power and distribution transformers) Any transformer intended for use in a circuit or system utilizing electron or solid-state devices. *Note:* Mercury-arc rectifier transformers and luminous-tube transformers are normally excluded from this classification. (PE/TR) C57.12.80-1978r

electronic trigger circuit A network containing electron tubes in which the output changes abruptly with an infinitesimal change in input at one or more points in the operating range. (IA/ICTL/IAC) [60]

electronic trip unit A self-contained portion of a circuit breaker that senses the condition of the circuit breaker electronically and that actuates the mechanism that opens the circuit breaker contacts automatically. (IA/PSP) 1015-1997

electronic tuning The process of changing the operating frequency of a system by changing the characteristics of a coupled electron stream. Characteristics involved are, for example: velocity, density, or geometry. *See also:* oscillatory circuit. (ED) 161-1971w

electronic tuning range The frequency range of continuous tuning between two operating points of specified minimum power output for an electronically tuned oscillator. *Note:* The reference points are frequently the half-power points, but should always be specified. *See also:* oscillatory circuit. (ED) 161-1971w

electronic tuning sensitivity At a given operating point, the rate of change of oscillator frequency with the change of the controlling electron stream. For example, this change may be expressed in terms of an electrode voltage or current. *See also:* oscillatory circuit; pushing figure. (ED) 161-1971w

electronic-warfare support measures (ESM) Actions taken to search for, intercept, locate in angle, record, and analyze radiated electromagnetic energy for the purpose of exploiting such radiations in support of military operations. (AES) 686-1997

electron injector The electron gun of a betatron. (ED) [45]

electron lens A device for the purpose of focusing an electron (ion) beam. *See also:* electron optics. (Std100) [84]

electron microscope An electron-optical device that produces a magnified image of an object. *Note:* Detail may be revealed by virtue of selective transmission, reflection, or emission of electrons by the object. (ED) [45]

electron mirror An electronic device causing the total reflection of an electron beam. *See also:* electron optics. (ED) [45]

electron multiplier A structure, within an electron tube, that employs secondary electron emission from solids to produce current amplification. *See also:* amplifier; electron emission. (ED/NPS) 161-1971w, 398-1972r

electron multiplier transit time That portion of photomultiplier transit time corresponding to the time delay between an electron packet leaving the first dynode and the multiplier packet striking the anode. (NPS) 398-1972r

electron optics The branch of electronics that deals with the operation of certain electronic devices, based on the analogy between the path of electron (ion) beams in magnetic or electric fields and that of light rays in refractive media. (ED) [45], [84]

electron-ray indicator tube An elementary form of cathode-ray tube used to indicate a change of voltage. *Note:* Such a tube used to indicate the tuning of a circuit is sometimes called a magic eye. *See also:* cathode-ray tube. (ED) [45], [84]

electron resolution The ability of the electron multiplier section of the photomultiplier to resolve inputs consisting of n and $n + 1$ electrons. This may be expressed as a fractional full width at half maximum of the nth peak, as the peak to valley ratio of the nth peak to the valley between the nth and $n \times 1$th peaks. (NPS) 398-1972r

electrons, conduction *See:* conduction electrons.

electron sheath (gas) A film of electrons (or of ions) that has formed on or near a surface that is held at a potential different from that of the discharge. *Synonym:* ion sheath. *See also:* discharge. (ED) [45], [84]

electron-stream potential (electron tube) (any point in an electron stream) The time average of the potential differential difference between that point and the electron-emitting surface. *See also:* electron emission. (ED) 161-1971w

electron-stream transmission efficiency (electron tube) (electrode through which the electron stream passes) The ratio of the average stream current through the electrode to the average stream current approaching the electrode. *Note:* In connection with multitransit tubes, the term electron stream should be taken to include only electrons approaching the electrode for the first time. *See also:* electron emission. (ED) 161-1971w

electron telescope An optical instrument for astronomy including an electronic image transformer associated with an optical telescope. *See also:* electron optics. (ED) [45], [84]

electron tube An electron device in which conduction by electrons takes place through a vacuum or gaseous medium within a gastight envelope. *Note:* The envelope may be either pumped during operation or sealed off. (ED) 161-1971w

electron-tube admittances The cross-referenced terms generalize the familiar electron-tube coefficients so that they apply to all types of electron devices operated at any frequency as linear transducers. *Note:* The generalizations include the familiar low-frequency tube concepts. In the case of a riode, for example, at relatively low frequencies the short-circuit input admittance reduces to substantially the grid admittance, the short-circuit output admittance reduces to substantially the plate admittance, the short-circuit forward admittance reduces to substantially the grid-plate transconductance, and the short-circuit feedback admittance reduces to substantially the admittance of the grid-plate capacitance. When reference is made to alternating-voltage or -current components, the components are understood to be small enough so that linear relations hold between the various alternating voltages and currents. Consider a generalized network or transducer having n available terminals to each of which is flowinga complex alternating component I_j of the current and between each of which and a reference point (which may or may not be one of the n network terminals) is applied a complex alternating voltage V_j. This network represents an n-terminal electron device in which each one of the terminals is connected to an electrode. (EEC/PE) [119]

electron-tube amplifier An amplifier that obtains its amplifying properties by means of electron tubes. (IA/IAC) [60]

electron-wave tube An electron tube in which mutually interacting streams of electrons having different velocities cause a signal modulation to change progressively along their length. (ED) 161-1971w

electronvolt The kinetic energy acquired by an electron in passing through a potential difference of 1V in vacuum; 1 eV = $1.602\ 19 \times 10^{-19}$ J approximately. (QUL) 268-1982s

electro-optic effect (fiber optics) A change in the refractive index of a material under the influence of an electric field. *Notes:* 1. Pockels and Kerr effects are electro-optic effects that are respectively linear and quadratic in the electric field strength. 2. "Electro-optic" is often erroneously used as a synonym for "optoelectronic." *See also:* optoelectronic. (Std100) 812-1984w

electro-optic field meter A meter that measures changes in the transmission of light through a fiber or crystal due to the influence of the electric field. *Note:* While there are several

electro-optic methods that can be used for measuring electric fields, e.g., the Pockels effect, the Kerr effect, and interferometric techniques, this recommended practice only considers electro-optic field meters that utilize the Pockels effect. (T&D/PE) 1308-1994

electroosmosis The movement of fluids through diaphragms that is as a result of the application of an electric current. (EEC/PE) [119]

electroosmotic potential (electrobiology) The electrokinetic potential gradient producing unit velocity of liquid flow through a porous structure. *See also:* electrobiology. (EMB) [47]

electrophonic effect The sensation of hearing produced when an alternating current of suitable frequency and magnitude from an external source is passed through an animal. (SP) [32]

electrophoresis A movement of colloidal ions as a result of the application of an electric potential. *See also:* ion. (EEC/PE) [119]

electrophoretic potential (electrobiology) The electrokinetic potential gradient required to produce unit velocity of a colloidal or suspended material through a liquid electrolyte. *See also:* electrobiology. (EMB) [47]

electroplating The electrodeposition of an adherent coating upon an object for such purposes as surface protection or decoration. (EEC/PE) [119]

electropneumatic brake An air brake that is provided with electrically controlled valves for control of the application and release of the brakes. *Note:* The electric control is usually in addition to a complete air brake equipment to provide a more prompt and synchronized operation of the brakes on two or more vehicles. *See also:* electric braking. (EEC/PE) [119]

electropneumatic contactor (1) A contactor actuated by air pressure. *See also:* contactor. (IA/ICTL/IAC) [60]
(2) (electropneumatic unit switch) A contactor or switch controlled electrically and actuated by air pressure. *See also:* control switch; contactor. (VT/LT) 16-1955w

electropneumatic controller An electrically supervised controller having some or all of its basic functions performed by air pressure. *See also:* multiple-unit control; electric controller. (IA/IAC) [60]

electropneumatic interlocking machine An interlocking machine designed for electric control of electropneumatically operated functions. *See also:* centralized traffic-control system. (EEC/PE) [119]

electropneumatic valve An electrically operated valve that controls the passage of air. (EEC/PE) [119]

electropolishing (electroplating) The smoothing or brightening of a metal surface by making it anodic in an appropriate solution. *See also:* electroplating. (EEC/PE) [119]

electrorefining The process of electrodissolving a metal from an impure anode and depositing it in a more pure state. (EEC/PE) [119]

electroretinogram *See:* electrodermogram.

electroscope An electrostatic device for indicating a potential difference or an electric charge. *See also:* instrument. (EEC/PE) [119]

electrosensitive printer A nonimpact printer in which images are generated on specially coated paper by an electric stylus. (C) 610.10-1994w

electroshock therapy The production of a reaction in the central nervous system by means of electric current applied to the cranium. *See also:* electrotherapy. (EMB) [47]

electrostatic actuator An apparatus constituting an auxiliary external electrode that permits the application of known electrostatic forces to the diaphragm of a microphone for the purpose of obtaining a primary calibration. *See also:* microphone. (SP) [32]

electrostatic coupling *See:* signal.

electrostatic deflection (cathode-ray tubes) Deflecting an electron beam by the action of an electric field. *See also:* cathode-ray tube. (ED) [45]

electrostatic discharge (ESD) (1) Electrical discharges of static electricity that build up on personnel or equipment, generated by interaction of dissimilar materials. (PE/IC) 1143-1994r
(2) The sudden transfer of charge between bodies of differing electrostatic potentials. (EMC) C63.16-1993
(3) The sudden transfer of charge between bodies of differing electrostatic potentials that may produce voltages or currents that could destroy or damage electrical components. (EMB/MIB) 1073.3.2-2000

electrostatic electrography The branch of electrostatography that employs an insulating medium to form, without the aid of electromagnetic radiation, latent electrostatic-charge patterns for producing a viewable record. *See also:* electrostatography. (ED) [46]

electrostatic electron microscope An electron microscope with electrostatic lenses. *See also:* electron optics. (ED) [45]

electrostatic electrophotography The branch of electrostatography that employs a photoresponsive medium to form, with the aid of electromagnetic radiation, latent electrostatic-charge patterns for producing a viewable record. *See also:* electrostatography. (ED) [46]

electrostatic focusing (electron beams) A method of focusing an electron beam by the action of an electric field. (ED) 161-1971w

electrostatic induction* **(electric coupling)** A common misnomer. The term "static" implies "at rest" or not varying with time. Therefore, this term may be construed to mean induced potential or current resulting from an object being placed in a dc electric field, but often the term is loosely used to include ac field effects. (T&D/PE) 1048-1990
* Deprecated.

electrostatic instrument An instrument that depends for its operation on the forces of attraction and repulsion between bodies charged with electricity. *See also:* instrument. (EEC/PE) [119]

electrostatic lens An electron lens in which the result is obtained by an electrostatic field. *See also:* electron optics.

electrostatic loudspeaker A loudspeaker in which the mechanical forces are produced by the action of electrostatic fields. *Synonyms:* condenser loudspeaker; capacitor loudspeaker. (SP) [32]

electrostatic microphone A microphone that depends for its operation upon variations of its electrostatic capacitance. *Synonyms:* condenser microphone; capacitor microphone. *See also:* microphone. (SP) [32]

electrostatic plotter A raster plotter in which images are drawn by attracting toner particles to a static charge on the surface of a photoconductor, then transferring the image to a sheet of paper. (C) 610.10-1994w

electrostatic printer A nonimpact printer in which images are generated by attracting toner particles to a static charge on the surface of a photoconductor, then transferring the image to a sheet of paper. *Synonym:* optical printer. (C) 610.10-1994w

electrostatic recording (facsimile) Recording by means of a signal-controlled electrostatic field. *See also:* recording. (COM) 168-1956w

electrostatic relay (1) A relay in which operation depends upon the application or removal of electrostatic charge. 341-1956
(2) A relay in which the actuator element consists of nonconducting media separating two or more conductors that change their relative positions because of the mutual attraction or repulsion by electric charges applied to the conductors. *See also:* relay. (EEC/REE) [87]

electrostatics The branch of science that treats of the electric phenomena associated with electric charges at rest in the frame of reference. (Std100) 270-1966w

electrostatic storage A type of storage that uses electrically charged areas on a dielectric surface layer. *See also:* Williams-tube storage. (C) [20], 610.10-1994w, [85]

electrostatic voltmeter A voltmeter depending for its action upon electric forces. An electrostatic voltmeter is provided with a scale, usually graduated in volts or kilovolts. *See also:* instrument. (EEC/PE) [119]

electrostatic wave *See:* longitudinal wave.

electrostatography The formation and utilization of latent electrostatic-charge patterns for the purpose of recording and reproducing patterns in viewable form. (ED) 224-1965w, [46]

electrostenolysis The discharge of ions or colloidal ions in capillaries through the application of an electric potential. *See also:* ion. (EEC/PE) [119]

electrostrictive relay A relay in which an electrostrictive dielectric serves as the actuator. *See also:* relay. (EEC/REE) [87]

electrotaxis (galvanotaxis) (electrobiology) The act of a living organism in arranging itself in a medium in such a way that its axis bears a certain relation to the direction of the electric current in the medium. *See also:* electrobiology. (EMB) [47]

electrotherapy The use of electric energy in the treatment of disease. (EMB) [47]

electrothermal efficiency The ratio of energy usefully employed in a furnace to the total energy supplied. *See also:* electrothermics. (EEC/PE) [119]

electrothermal recording (facsimile) That type of recording that is produced principally by signal-controlled thermal action. *See also:* recording. (COM) 168-1956w

electrothermic-coupler unit (electrothermic power meters) A three-port directional coupler with an electrothermic unit attached to either the side arm or the main arm which is normally used as a feed-through power measuring system. Typically, an electrothermic unit is attached to the side arm of the coupler so that the power at the output port of the main arm can be determined from a measurement of the power in the side arm. This system also can be used as a terminating powermeter by terminating the output port of the directional coupler. (IM) 544-1975w

electrothermic element (electrothermic power meters) A power absorber and a thermocouple (or thermopile) which are either two separate units or where the thermocouple (or thermopile) is also the power absorber. (IM) 544-1975w

electrothermic instrument An instrument that depends for its operation on the heating effect of a current or currents. *Note:* Among the several possible types are the expansion type, including the hot-wire and hot-strip instruments; the thermocouple type; and the bolometric type. *See also:* instrument. (EEC/PE) [119]

electrothermic mount (electrothermic power meters) A waveguide or transmission line structure which is designed to accept the electrothermic element. It normally contains internal matching devices or other reactive elements to obtain specified impedance conditions at its input terminal when an electrothermic element is installed. It usually contains a means of protecting the electrothermic element and the immediate environment from thermal gradients which would cause an undesirable thermoelectric output. (IM) 544-1975w

electrothermic power indicator (electrothermic power meters) An instrument that may or may not amplify the low level dc output voltage from the electrothermic unit and provides a display, usually in the form of the D'Arsonval type indication or a digital readout. (IM) 544-1975w

electrothermic power indicator error (electrothermic power meters) Ability of the metering circuitry to indicate exactly the substituted power within an electrothermic unit. Included are such factors as meter calibration, open loop gain, meter linearity, tracking errors, range switching errors, line voltage errors, and temperature compensation errors. (IM) 544-1975w

electrothermic power meter This consists of an electrothermic unit and an electrothermic power indicator. (IM) 544-1975w

electrothermics The branch of science and technology that deals with the direct transformation of electric energy and heat. (EEC/PE) [119]

electrothermic substitution power (electrothermic power meters) The power at a reference frequency which, when dissipated in the electrothermic element, produces the same dc electrothermic output voltage that the element produces when subjected to radio frequency power. (IM) 544-1975w

electrothermic technique of power measurement (electrothermic power meters) A technique wherein the heating effect of power dissipated in an electrothermic element (which consists of an energy absorber and a thermocouple or thermopile) is used to generate a dc voltage. The power is dissipated either in a separate absorber or in the resistance of the electrothermic element. The resultant heat causes a temperature rise in a portion of the element. This temperature rise is sensed by the thermocouple which generates a dc output voltage proportional to the power. (IM) 544-1975w

electrothermic unit (electrothermic power meters) An assembly consisting of the electrothermic element installed in the electrothermic mount. (IM) 544-1975w

electrotonic wave (electrobiology) A brief nonpropagated change of potential on an excitable membrane in the vicinity of an applied stimulus; it is often accompanied by a propagated response and always by electrotonus. *See also:* excitability. (EMB) [47]

electrotonus (A) (physical) The change in distribution of membrane potentials in nerve and muscle during or after the passage of an electric current. *See also:* excitability. **(B) (physiological)** The change in the excitability of a nerve or muscle during the passage of an electric current. *See also:* excitability. (EMB) [47]

electrotyping The production or reproduction of printing plates by electroforming. (EEC/PE) [119]

electrowinning The electrodeposition of metals or compounds from solutions derived from ores or other materials using insoluable anodes. (EEC/PE) [119]

element (1) A representation of all or part of a logic function within a single outline, which may, in turn, be subdivided into smaller elements representing subfunctions of the overall function. Alternatively, the function so represented. (GSD) 91-1984r

(2) (measuring longitudinal balance of telephone equipment operating in the voice band) Any electric device (such as inductor, resistor, capacitor, generator, or line) with terminals at which it may be directly connected to other devices, elements, or apparatus. (COM/TA) 455-1985w

(3) (electron tube) A constituent part of the tube that contributes directly to its electrical operation. (ED) 161-1971w

(4) (semiconductor devices) Any integral part that contributes to its operation. (ED) 216-1960w

(5) (integrated circuit) A constituent part of the integrated circuit that contributes directly to its operation. (ED) 274-1966w, [46]

(6) (storage cell) Consists of the positive and negative groups with separators, or separators and retainers, assembled for one cell. (EEC/PE) [119]

(7) (primary detecting) That portion of the feedback elements which first either utilizes or transforms energy from the controlled medium to produce a signal that is a function of the value of the directly controlled variable. (PE/EDPG) 421-1972s

(8) A product, subsystem, assembly, component, subcomponent or subassembly, or part of a physical or system architecture, specification tree, or system breakdown structure, including the system itself. (C/SE) 1220-1994s

(9) A functional interface or a namespace allocation. Examples of elements are C functions or utility programs. Examples of namespace allocation include headers or error return value constants. (C/PA) 2003.1-1992, 13210-1994

(10) A functional interface or a namespace allocation. Examples of elements are functions and utility programs. Examples of namespace allocation include headers and error return value constants. (C/PA) 2003-1997

(11) A component of a circuit, such as a resistor or capacitor. (C) 610.10-1994w

(12) Any of the bits of a bit string, the octets of an octet string, or the bytes by means of which the characters of a character string are represented. (C/PA) 1224-1993w, 1327-1993 w, 1328-1993w

(13) Within AI-ESTATE, element refers to the smallest entity of a model. For example, in a particular model, the smallest test, the smallest diagnosis, and the no-fault conclusion are all elements. (SCC20) 1232.1-1997

(14) A component of a system; may include equipment, a computer program, or a human. (C/SE) 1233-1998

(15) *See also:* relay element. (SWG/PE) C37.100-1981s

(16) (computing system) *See also:* combinational logic element; logic element; threshold element.

(17) *See also:* array element; director element; driven element; linear electric current element; linear magnetic current element; multiwire element; parasitic element; radiating element; reflector element. (AP/ANT) 145-1993

(18) (data management) *See also:* binary element; data element. (C) 610.5-1990w

elemental area (facsimile) Any segment of the scanning line of the subject copy the dimension of which along the line is exactly equal to the nominal line width. *Note:* Elemental area is not necessarily the same as the scanning spot. *See also:* scanning. (COM) 168-1956w

elementary diagram (packaging machinery) A diagram using symbols and a plan of connections to illustrate, in simple form, the scheme of control. (IA/PKG) 333-1980w

element cell (of an array antenna) In an array having a regular arrangement of elements that can be made congruent by translation, an element and a region surrounding it that, when repeated by translation, covers the entire array without gaps or overlay between cells. *Note:* There are many possible choices for such a cell. Some may be more convenient than others for analytic purposes. (AP/ANT) 145-1993

element conduction interval (thyristor) That part of an operating cycle in which ON-state current flows in the basic control element. (IA/IPC) 428-1981w

element identifier (EID) A numeric identifier generated by the application on the onboard equipment (OBE) transponder. An EID is unambiguous within the context of a complete exchange of messages with an application on the roadside equipment (RSE). Multiple EIDs can be maintained between the RSE and OBE over a single data link session (LID). (SCC32) 1455-1999

element linear *See:* linear system or element.

element, measuring *See:* measuring element.

element nonconduction interval (thyristor) That part of an operating cycle during which no ON-state current flows in the basic control element. (IA/IPC) 428-1981w

element of a fix (navigation aid terms) The specific values of the navigation coordinates necessary to define a position. (AES/GCS) 172-1983w

element, primary detecting *See:* primary detecting element.

element printer An impact printer that generates characters using interchangeable print elements such as daisy wheels or thimbles, each of which contains a full character set. *See also:* chain printer; band printer; wheel printer; stick printer; bar printer; drum printer. (C) 610.10-1994w

elements The discrete pieces that make up an asset (e.g., documents, requirements specifications, test cases, source code, installation information, and read me files). (C/SE) 1420.1a-1996

elements, feedback *See:* feedback elements.

elements, forward *See:* forward elements.

elements, loop *See:* loop elements.

elements, reference-input *See:* reference-input elements.

element type A category or class of elements. (C/SE) 1420.1a-1996

ELEPL *See:* equal level echo path loss.

elevated duct A tropospheric radio duct in which the lower boundary is above the surface of the Earth. (AP/PROP) 211-1997

elevated-zero range A range where the zero value of the measured variable, measured signal, etc., is greater than the lower range value. *Note:* The zero may be between the lower and upper range values, at the upper range value, or above the upper range value. For example: −20 to 100; −40 to 0; and −50 to −10. *See also:* instrument. (EEC/EMI) [112]

elevation (illuminating engineering) The angle between the axis of a searchlight drum and the horizontal. For angles above the horizontal, elevation is positive, and below the horizontal negative. (EEC/IE) [126]

elevation angle (1) Complement of the angle of incidence. May also refer to the angle of radiation measured above the horizon from a source. *See also:* grazing angle. (AP/PROP) 211-1997

(2) In radar, the angle between the line-of-sight in the direction of interest and a horizontal reference plane, measured upwards. (AES) 686-1997

elevation rod (lightning protection) The vertical portion of conductor in an air terminal by means of which it is elevated above the object to be protected. (EEC/PE) [119]

elevator A hoisting and lowering mechanism equipped with a car or platform that moves in guides in a substantially vertical direction, and that serves two or more floors of a building or structure. (EEC/PE) [119]

elevator automatic dispatching device A device, the principal function of which is to either operate a signal in the car to indicate when the car should leave a designated landing; or actuate its starting mechanism when the car is at a designated landing. *See also:* control. (EEC/PE) [119]

elevator automatic signal transfer device A device by means of which a signal registered in a car is automatically transferred to the next car following, in case the first car passes a floor, for which a signal has been registered, without making a stop. *See also:* control. (EEC/PE) [119]

elevator car The load-carrying unit including its platform, car frame, enclosure, and car door or gate. *See also:* elevator. (EEC/PE) [119]

elevator car bottom runby (elevators) The distance between the car buffer striker plate and the striking surface of the car buffer when the car floor is level with the bottom terminal landing. *See also:* elevator. (EEC/PE) [119]

elevator-car flash signal device One providing a signal light, in the car, that is illuminated when the car approaches the landings at which a landing-signal-registering device has been actuated. *See also:* control. (EEC/PE) [119]

elevator car-leveling device Any mechanism that will, either automatically or under the control of the operator, move the car within the leveling zone toward the landing only, and automatically stop it at the landing. *Notes:* 1. Where controlled by the operator by means of up-and-down continuous-pressure switches in the car, this device is known as an inching device. 2. Where used with a hydraulic elevator to correct automatically a change in car level caused by leakage in the hydraulic system, this device is known as an anticreep device. *See also:* leveling zone; two-way automatic maintaining leveling device; one-way automatic leveling device; two-way automatic nonmaintaining leveling device; elevator. (EEC/PE) [119]

elevator counterweight bottom runby The distance between the counterweight buffer striker plate and the striking surface of the counterweight buffer when the car floor is level with

the top terminal landing. *See also:* elevator. (EEC/PE) [119]

elevator landing That portion of a floor, balcony, or platform used to receive and discharge passengers or freight. *See also:* landing zone; bottom-terminal landing; top terminal landing. (EEC/PE) [119]

elevator-landing signal registering device A button or other device, located at the elevator landing that, when actuated by a waiting passenger, causes a stop signal to be registered in the car. *See also:* control. (EEC/PE) [119]

elevator-landing stopping device A button or other device, located at an elevator landing that, when actuated, causes the elevator to stop at that floor. *See also:* control. (EEC/PE) [119]

elevator parking device An electric or mechanical device, the function of which is to permit the opening, from the landing side, of the hoistway door at any landing when the car is within the landing zone of that landing. The device may also be used to close the door. *See also:* control. (EEC/PE) [119]

elevator pit That portion of a hoistway extending from the threshold level of the lowest landing door to the floor at the bottom of the hoistway. *See also:* elevator. (EEC/PE) [119]

elevator separate-signal system A system consisting of buttons or other devices located at the landings that, when actuated by a waiting passenger, illuminate a flash signal or operate an annunciator in the car, indicating floors at which stops are to be made. *See also:* control. (EEC/PE) [119]

elevator signal-transfer switch A manually operated switch, located in the car, by means of which the operator can transfer a signal to the next car approaching in the same direction, when he desires to pass a floor at which a signal has been registered in the car. *See also:* control. (EEC/PE) [119]

elevator starter's control panel An assembly of devices by means of which the starter may control the manner in which an elevator, or group of elevators, functions. *See also:* control. (EEC/PE) [119]

elevator truck zone The limited distance above an elevator landing within which the truck-zoning device permits movement of the elevator car. *See also:* control. (EEC/PE) [119]

elevator truck-zoning device A device that will permit the operator in the car to move a freight elevator, within the truck zone, with the car door or gate and a hoistway door open. *See also:* control. (EEC/PE) [119]

eleven punch A zone punch in punch row eleven (second from the top) in a twelve-row punch card. *Synonym:* X punch. *See also:* zero punch; twelve punch. (C) 610.10-1994w

ELF *See:* extremely low frequency.

elliptically polarized field vector At a point in space, a field vector whose extremity describes an ellipse as a function of time. *Note:* Any single-frequency field vector is elliptically polarized if "elliptical" is understood in the wide sense as including circular and linear. Often, however, the expression is used in the strict sense meaning noncircular and nonlinear. (AP/MTT/ANT) 145-1993, 146-1980w

elliptically polarized plane wave A plane wave whose electric field vector is elliptically polarized. (AP/ANT) 145-1993

elliptically polarized wave (1) (given frequency) An electromagnetic wave for which the component of the electric vector in a plane normal to the direction of propagation describes an ellipse. *See also:* electromagnetic waves; radiation; waveguide; radio transmitter. (MTT) 146-1980w

(2) An electromagnetic wave for which the locus of the tip of the electric field vector is an ellipse in a plane orthogonal to the wave normal. This ellipse is traced at the rate in radians equal to the angular frequency of the wave. *See also:* left-hand polarized wave; right-hand polarized wave. (AP/PROP) 211-1997

elliptical orbit (communication satellite) An orbit of a satellite in which the distance between the centers of mass of the satellite and of the primary body is not constant. The general type of orbit is a special case. (COM) [19]

elliptic filter A filter having an equiripple pass band and an equiminima stop band. (CAS) [13]

ellipticity *See:* waveguide; axial ratio.

EM *See:* end-of-medium character.

E-Mail *See:* electronic mail.

emanations attacks Passive collection, analysis, and interpretation of electromagnetic emissions from and the direction of electromagnetic interference at electrical and electronic equipment. Emanations attacks may be perpetrated at several points in a system (e.g., processors, input/output devices, communication channels, power sources), and could result in unauthorized disclosure or modification of information, denial of service to legitimate users or critical functions, or destruction of sensitive electronic components (e.g., from an electromagnetic pulse created by a nuclear explosion). (C/BA) 896.3-1993w

emanations security Protection of electromagnetic emanations of systems from unauthorized interception and analysis, and protection of the system from electromagnetic interference. *See also:* tempest; electromagnetic interference. (C/BA) 896.3-1993w

embedded coil side (rotating machinery) That part of a coil side which lies in a slot between the ends of the core. (PE) [9]

embedded computer system (software) A computer system that is part of a larger system and performs some of the requirements of that system; for example, a computer system used in an aircraft or rapid transit system. (C) 610.12-1990, 610.10-1994w

embedded data dictionary *See:* active data dictionary.

embedded hyphen *See:* required hyphen.

embedded software Software that is part of a larger system and performs some of the requirements of that system; for example, software used in an aircraft or rapid transit system. (C) 610.12-1990

embedded temperature detector (1) (rotating machinery) An element, usually a resistance thermometer or thermocouple, built into apparatus for the purpose of measuring temperature. *Notes:* 1. This is ordinarily installed in a stator slot between coil sides at a location at which the highest temperature is anticipated. 2. Examination or replacement of an embedded detector after the apparatus is placed in service is usually not feasible. (SWG/PE) C37.30-1971s, [9]

(2) A resistance thermometer or thermocouple built into a machine for the purpose of measuring the temperature. (IA/MT) 45-1998

embossing stylus A recording stylus with a rounded tip that displaces the material in the recording medium to form a groove. *See also:* phonograph pickup. (SP) [32]

embrittlement Severe loss of ductility of a metal or alloy. (IA) [59]

EMC *See:* electromagnetic compatibility.

emergency announcing system A system of microphones, amplifier, and loud speakers (similar to a public address system) to permit instructions and orders from a ship's officers to passengers and crew in an emergency and particularly during abandon-ship operations. (EEC/PE) [119]

emergency brake Fail-safe, open-loop braking to a complete stop with an assured maximum stopping distance, considering all relevant factors. Once the brake application is initiated, it is irretrievable, i.e., it cannot be released until the train has stopped or a predetermined time has passed. (VT/RT) 1475-1999, 1474.1-1999

emergency cells (storage cell) End cells that are held available for use exclusively during emergency discharges. *See also:* battery. (PE/EEC) [119]

emergency egress A path or route that provides an immediate exit path or way out of an area in the event of a sudden, unexpected, or dangerous occurrence. (PE/NP) 692-1997

emergency electric system (marine) All electric apparatus and circuits the operation of which, independent of ship's service supply, may be required under casualty conditions for preservation of a ship or personnel. (PE/EEC) [119]

emergency generator (marine) An internal-combustion-engine-driven generator so located in the upper part of a vessel as to permit operation as long as the ship can remain afloat, and capable of operation, independent of any other apparatus on the ship, for supply of power to the emergency electric system upon failure of a ship's service power. *See also:* emergency electric system. (PE/EEC) [119]

emergency lighting (illuminating engineering) Lighting designed to supply illumination essential to the safety of life and property in the event of failure of the normal supply. (EEC/IE) [126]

emergency lighting storage battery A storage battery for instant supply of emergency power, upon failure of a ship's service supply, to certain circuits of special urgency principally temporary emergency lighting. *See also:* emergency electric system. (EEC/PE/MT) [119]

emergency maintenance Unscheduled corrective maintenance performed to keep a system operational. (C/SE) 1219-1998

emergency message An arbitration cycle with a special high arbitration number, which is selected from a set of numbers assigned to emergency messages. (C/MM) 896.1-1987s

emergency operations area (nuclear power generating station) Functional area(s) allocated for the displays used to assess the status of safety systems and the controls for manual operations required during emergency situations. (PE/NP) 566-1977w

emergency power (power operations) (electric power system) Power required by a system to make up a deficiency between the current firm power demand and the immediately available generating capability. (PE/PSE) 858-1987s, 346-1973w

emergency power feedback An arrangement permitting feedback of emergency-generator power to a ship's service system for supply of any apparatus on the ship within the limit of the emergency-generator rating. *See also:* emergency electric system. (EEC/PE) [119]

emergency power system An independent reserve source of electric energy that, upon failure or outage of the normal source, automatically provides reliable electric power within a specified time to critical devices and equipment whose failure to operate satisfactorily would jeopardize the health and safety of personnel or result in damage to property. (IA/PSE) 446-1995

emergency rating (1) The level of power flow in excess of the normal rating that a facility can carry for the time sufficient for adjustment of transfer schedules or generation dispatch in an orderly manner, with acceptable loss of life to the facility involved. (PE/PSE) 858-1993w

(2) (generating station) Capability of installed equipment for a short time interval. (PE/PSE) 346-1973w

emergency service An additional service intended only for use under emergency conditions. *See also:* service; duplicate service; loop service; dual service. (T&D/PE) [10]

emergency stop switch (elevators) A device located in the car that, when manually operated, causes the electric power to be removed from the driving-machine motor and brake of an electric elevator or from the electrically operated valves and/or pump motor of a hydraulic elevator. *See also:* control. (EEC/PE) [119]

emergency switchboard (1) A switchboard for control of sources of emergency power and for distribution to all emergency circuits. *See also:* emergency electric system. (EEC/PE) [119]

(2) A switchgear and control assembly that receives energy from the emergency generating plant and distributes directly or indirectly to all emergency loads. (IA/MT) 45-1998

emergency system (1) (health care facilities) A system of feeders and branch circuits meeting the requirements of Article 700 of NFPA 70-1978, National Electrical Code, and intended to supply alternate power to a limited number of prescribed functions vital to the protection of life and safety, with automatic restoration of electrical power within 10 seconds of power interruption. (EMB) [47]

(2) A system of feeders and branch circuits meeting the requirements of Article 700, connected to alternate power sources by a transfer switch and supplying energy to an extremely limited number of prescribed functions vital to the protection of life and patient safety, with automatic restoration of electrical power within 10 seconds of power interruption. (NESC/NEC) [86]

emergency-terminal stopping device (elevators) A device that automatically causes the power to be removed from an electric elevator driving-machine motor and brake, or from a hydraulic elevator machine, at a predetermined distance from the terminal landing, and independently of the functioning of the operating device and the normal-terminal stopping device, if the normal-terminal stopping device does not slow down the car as intended. *See also:* control. (PE/EEC) [119]

emergency transfer capability (electric power supply) The maximum amount of power that can be transmitted following a loss of transmission or generation capacity without causing additional transmission outages. (PE/PSE) 346-1973w

emergency voltage limit (power operations) The voltage range that is acceptable without serious system consequences, for the time sufficient for system adjustments to be made. *See also:* normal voltage limit. (PE/PSE) 858-1987s

emerging standard A specification that is under consideration by an accredited standards development organization, but that has not completed the process of approval by the sponsoring body. Emerging standards are often subject to significant change prior to approval. (C/PA) 14252-1996, 1003.23-1998l

E meter *See:* electricity meter.

EMF *See:* electromotive force.

EMI *See:* electromagnetic interference.

emission (1) (laser maser) The transfer energy from matter to a radiation field. (LEO) 586-1980w

(2) (radio-noise emissions) (electromagnetic) The phenomenon by which electromagnetic energy emanates from a source. (EMC) C63.4-1991

emission characteristic A relation, usually shown by a graph, between the emission and a factor controlling the emission (such as temperature, voltage, or current of the filament or heater). *See also:* electron emission. (ED) 161-1971w

emission current The current resulting from electron emission. (ED) [45], [84]

emission current, field-free *See:* field-free emission current.

emission efficiency (thermionics) The quotient of the saturation current by the heating power absorbed by the cathode. *See also:* electron emission. (ED) [45], [84]

emission probability per decay The probability that a radioactive decay will be followed by the emission of the specified radiation. Gamma-ray emission probabilities are often expressed per 100 decays. (NI) N42.14-1991

emissivity (1) (fiber optics) The ratio of power radiated by a substance to the power radiated by a blackbody at the same temperature. Emissivity is a function of wavelength and temperature. *See also:* blackbody. (Std100) 812-1984w

(2) (photovoltaic power system) The emittance of a specimen of material with an optically smooth, clean surface and sufficient thickness to be opaque. *See also:* photovoltaic power system. (AES) [41]

(3) The ratio of power (per unit surface area, per unit solid angle, over a specified bandwidth) radiated by a material body to the power radiated by a blackbody at the same temperature. (AP/PROP) 211-1997

emittance (1) (illuminating engineering) ε The ratio of radiance in a given direction (for directional emittance) or radiant

exitance (for hemispherical emittance) of a sample of a thermal radiator to that of a blackbody radiator at the same temperature. Formerly, exitance. The use of exitance with this meaning is deprecated. (EEC/IE) [126]

(2) (photovoltaic power system) The ratio of the radiant flux-intensity from a given body to that of a black body at the same temperature. *See also:* photovoltaic power system. (AES) [41]

emitter (1) (transistor) A region from which charge carriers that are minority carriers in the base are injected into the base. (ED/IA) 216-1960w, [12], 270-1966w

(2) A device that is able to discharge detectable electromagnetic, seismic, or acoustic energy. (DIS/C) 1278.1-1995

emitter-coupled logic A family of non-saturated, very high speed, bipolar logic devices that are commonly used in high performance processors, which dissipate relatively large amounts of power. (C) 610.10-1994w

emitter junction (semiconductor devices) A junction normally biased in the low-resistance direction to inject minority carriers into an interelectrode region. *See also:* semiconductor; transistor. (Std100) 270-1966w

emitter, majority *See:* majority emitter.

emitter, minority *See:* minority emitter.

emitting sole (microwave tubes) An electron source in crossed-field amplifiers that is extensive and parallel to the slow-wave circuit and that may be a hot or cold electron-emitter. (ED) [45]

EMP *See:* electromagnetic pulse.

emperor The processor that has the responsibility for initialization of an entire multiprocessor system. (C/MM) 1596-1992

emperor processor (1) The monarch processor that is selected to initialize and configure the system. On a single-bus system, the monarch and emperor processor are always the same. On a multiple-bus system, the single emperor processor is selected from the available monarch processors. (C/MM) 1212-1991s

(2) The monarch processor selected to direct the configuration and initialization of an entire system with multiple interconnected logical buses. (C/BA) 896.4-1993w, 10857-1994

emphasis Highlighting, color change, or another visual indication of the condition of an object or choice, and the effect of that condition on the ability of the user to interact with that object or choice. Emphasis can also give the user additional information about the state of an object or choice. (C) 1295-1993w

empirical Pertaining to information that is derived from observation, experiment, or experience. (C) 610.3-1989w

empirical propagation model A propagation model that is based solely on measured path-loss data. *See also:* electromagnetic compatibility. (EMC) [53]

empty directory (1) A directory that contains, at most, directory entries for dot and dot-dot. (C/PA) 9945-1-1996, 9945-2-1993

(2) A directory that contains, at most, entries for dot and dot-dot. (C) 1003.5-1999

empty line A line consisting of only a ⟨newline⟩ character. *See also:* blank line. (C/PA) 9945-2-1993

empty medium (1) A data medium that does not contain data. (C) 610.5-1990w

(2) A data medium that contains only marks of reference and no user data; For example, a formatted floppy disk. *See also:* blank medium; virgin medium. (C) 610.10-1994w

empty queued arbitrated slot A Queued Arbitrated (QA) slot that was designated by the Head of Bus function as being available for transfer of a QA segment, and that does not contain a QA segment. (LM/C) 8802-6-1994

empty string (1) A character array whose first element is a null character. *Synonym:* null string. (C/PA) 9945-1-1996, 9945-2-1993

(2) A zero-length array whose components are of some character type. *Synonym:* null string. (C) 1003.5-1999

empty weight *See:* actual weight.

EMT *See:* electrical metallic tubing.

emulate To represent a system by a model that accepts the same inputs and produces the same outputs as the system represented. For example, to emulate an 8-bit computer with a 32-bit computer. *See also:* simulate. (C) 610.3-1989w

emulation (A) (software) A model that accepts the same inputs and produces the same outputs as a given system. *See also:* simulation. **(B) (software)** The process of developing or using a model as in (A). (C) 610.3-1989, 610.12-1990

emulator (modeling and simulation) (software) A device, computer program, or system that performs emulation. (C) 610.3-1989w, 610.12-1990

enable (1) (supervisory control, data acquisition, and automatic control) (station control and data acquisition) A command or condition that permits some specific event to occur. (PE/SUB) C37.1-1994

(2) A command or condition that permits some specific event to proceed. (SWG/PE) C37.100-1992

enable high only (local area networks) A link control signal from an upper repeater to a lower repeater pre-empting a lower repeater's normal- priority round-robin control cycle. (C) 8802-12-1998

enabling pulse (1) (navigation) A pulse that prepares a circuit for some subsequent action. (AES/RS) 686-1982s, [42]

(2) A pulse that opens an electric gate normally closed, or otherwise permits an operation for which it is a necessary but not a sufficient condition. *See also:* pulse. (EEC/PE) [119]

enamel (1) (general) A paint that is characterized by an ability to form an especially smooth film. (PE/IA/PC) [9], [65]

(2) (rotating machinery) (wire) A smooth film applied to wire usually by a coating process. *See also:* rotor; stator. (PE) [9]

encapsulated (rotating machinery) A machine in which one or more of the windings is completely encased by molded insulation. *See also:* asynchronous machine. (PE) [9]

encapsulation (1) (germanium gamma-ray detectors) (of a semiconductor radiation detector) The packaging of a detector for protective or mounting purposes, or both. (NPS) 325-1986s

(2) (software) A software development technique that consists of isolating a system function or a set of data and operations on those data within a module and providing precise specifications for the module. *See also:* information hiding; data abstraction. (C) 610.12-1990

(3) In the context of AI-ESTATE, the act of specifying a test or collection of tests together with associated preconditions and post conditions. (ATLAS) 1232-1995

(4) In the context of AI-ESTATE, the act of specifying a test or collection of tests together with the associated preconditions and postconditions. Alternately, the process of hiding all of the details of an object that do not contribute to the essential characteristics. (SCC20) 1232.1-1997

(5) A technique used by layered protocols to carry foreign protocols in a network. (C) 610.7-1995

(6) The grouping of data and operations upon that data into a single object. (SCC20) 1226-1998

(7) The concept that access to the names, meanings, and values of the responsibilities of a class is entirely separated from access to their realization. (C/SE) 1320.2-1998

(8) In 1000BASE-X, the process by which a MAC packet is enclosed within a PCS code-group stream. (C/LM) 802.3-1998

encipherment The cryptographic transformation of data to produce ciphertext. *See also:* cryptography. (LM/C) 802.10-1992

enclosed Surrounded by case, cage, or fence designed to protect the contained equipment and limit the likelihood, under normal conditions, of dangerous approach or accidental contact by persons or objects. (NESC) C2-1997

enclosed brake A brake that is provided with an enclosure that covers the entire brake, including the brake actuator, the brake

shoes, and the brake wheel. *See also:* electric drive. (IA/ICTL/IAC/APP) [60], [75]

enclosed capacitor (shunt power capacitors) A capacitor having enclosed terminals. The enclosure is provided with means for connection to a rigid or flexible conduit. (T&D/PE) 18-1992

enclosed cutout A cutout in which the fuse clips and fuseholder or disconnecting blade are mounted completely within an insulating enclosure. (SWG/PE) C37.40-1993, C37.100-1992

enclosed relay A relay that has both coil and contacts protected from the surrounding medium. *See also:* relay. (EEC/REE) [87]

enclosed self-ventilated machine A machine that has openings for the ventilating air circulated by means integral with the machine, the machine being otherwise totally enclosed. These openings are so arranged that inlet and outlet ducts or pipes may be connected. (IA/MT) 45-1998

enclosed separately ventilated machine A machine that has openings for ventilating air circulated by means external to and not a part of the machine, the machine being otherwise totally enclosed. These openings are so arranged that inlet and outlet duct pipes may be connected to them. (IA/MT) 45-1998

enclosed switch (safety switch) A switch either with or without fuse holders, meter-testing equipment, or accommodation for meters, having all current-carrying parts completely enclosed in metal, and operable without opening the enclosure. *See also:* switch. (IA/ICTL/IAC) [60]

enclosed switchboard A dead-front switchboard that has an overall sheet-metal enclosure (not grille) covering back and ends of the entire assembly. *Note:* Access to the interior of the enclosure is usually provided by doors or removable covers. The top may or may not be covered. (SWG/PE) C37.100-1992, C37.21-1985r

enclosed switches (indoor or outdoor) Switches designed for service within a housing restricting heat transfer to the external medium. (SWG/PE) C37.100-1992

enclosed switchgear assembly An assembly that is enclosed on all sides and top. (SWG/PE) C37.100-1992

enclosed ventilated (rotating machinery) A term applied to an apparatus with a substantially complete enclosure in which openings are provided for ventilation only. *See also:* asynchronous machine. (PE) [9]

enclosed ventilated apparatus Apparatus totally enclosed except that openings are provided for the admission and discharge of the cooling air. *Note:* These openings may be so arranged that inlet and outlet ducts or pipes may be connected to them. An enclosed ventilated apparatus or machine may be separately ventilated or self-ventilated. (EEC/PE) [119]

enclosure (1) (power system communication equipment) A surrounding case or housing to protect the contained equipment against external conditions and to prevent personnel from accidentally contacting live parts. (PE/PSC/TR) 281-1984w, C57.12.80-1978r

(2) The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage. (NESC/NEC) [86]

(3) A surrounding case or housing used to protect the contained equipment and to prevent personnel from accidentally contacting live parts. (SWG/PE) C37.23-1987r, C37.100-1992, [56]

(4) An identifiable housing, such as a cubicle, compartment, terminal box, panel, or enclosed raceway, used for electrical equipment or cables. (PE/NP) 384-1992r

enclosure currents (1) Currents that result from the voltages induced in the metallic enclosure by effects of currents flowing in the enclosed conductors. (SWG/PE/SUB) C37.122-1983s, C37.100-1992, C37.122.1-1993

(2) Currents that result from the voltages induced in the metallic enclosure by the current(s) flowing in the enclosed conductor(s). (PE/SUB) 80-2000

encode (1) (general) To express a single character or a message in terms of a code. (C) 162-1963w

(2) (electronic control) To produce a unique combination of a group of output signals in response to each of a group of input signals. (C) 162-1963w

(3) (computers) To apply the rules of a code. *See also:* matrix; translate; code; decode. (C) [20], [85]

(4) (modeling and simulation) To represent data in symbolic form using a code or a coded character set such that reconversion to the original form is possible. *Note:* Sometimes used when complete reconversion is not possible. *Contrast:* decode. *See also:* code. (Std100) 270-1966w

encoded data *See:* code.

encode/decode Encoding is the mapping of typed information from its internal datatype format into the types allowed by the signatures of the `Perform-`, `Execute-`, and `Publish-` like operations. Decoding is the mapping from the types allowed by the signatures of the `Perform-`, `Execute-`, and subscription callback-like operations into the datatypes used internally. (IM/ST) 1451.1-1999

encode-decode table *See:* code-decode table.

encoded symbol A 10-bit symbol created from 8-bit data using the 8B/10B encoding scheme. (C/BA) 1393-1999

encoder (1) A network or system in which only one input is excited at a time and each input produces a combination of outputs. *See also:* matrix. (Std100) 270-1966w

(2) A device that performs encoding. (COM/TA) 1007-1991r

(3) A device or system that encodes data. *Contrast:* decoder. (C) 610.5-1990w

encoding (1) A means of producing a unique combination of bits (a code) in response to an analog input signal. (COM/TA) 1007-1991r

(2) The representation of data bits and nondata information for signal transmission across a serial communications medium. Nondata information includes indications of start and end of octets and frame transmission. (EMB/MIB) 1073.4.1-2000

encoding law An algorithm for encoding; i.e., "μ-law" or "A law." (COM/TA) 1007-1991r

end-application The portion of a computer program that is separate from the communications stack. Specifically, an end-application does not include the Application Layer of the OSI Reference Model, nor any of the layers below that. (SCC32) 1488-2000

end-around carry (1) (computers) A carry generated in the most significant place and forwarded directly to the least significant place, for example, when adding two negative numbers, using nines complement. *See also:* carry. (C) 162-1963w

(2) (mathematics of computing) A carry process in which a carry digit generated in the most significant digit place is added directly to the least significant digit place. For example, when adding two negative numbers using nines complement. (C) 1084-1986w

end-around carry shift *See:* circular shift.

end-around shift *See:* circular shift.

end bell *See:* cable terminal.

end bracket (rotating machinery) A beam or bracket attached to the frame of a machine and intended for supporting a bearing. (PE) [9]

end capacitor A conducting element or group of conducting elements, connected at the end of a radiating element of an antenna, to modify the current distribution on the antenna, thus changing its input impedance. (AP/ANT) 145-1993

end cells (storage battery) (storage cell) Cells that may be cut in or cut out of the circuit for the purpose of adjusting the battery voltage. *See also:* battery. (PE/EEC) [119]

end closure The degree of accuracy with which two separate lines, defined to end at the same point, actually meet. (C) 610.6-1991w

end connector A female coupling which attaches to the ends of a coaxial cable section to interconnect sections. *Contrast:* barrel connector. (C) 610.7-1995

end device (1) (of a telemeter) The final system element that responds quantitatively to the measurand through the translating means and performs the final measurement operation. *Note:* An end device performs the final conversion of measurement energy to an indication, record, or the initiation of control. (SWG/PE) C37.100-1992

(2) The closest device to the sensor or control point within a metering application communication system that is compliant with the utility industry end device data tables. (AMR/SCC31) 1377-1997

end distortion (1) (data transmission) The shifting of the end of all marking pulses from their proper positions in relation to the beginning of the start pulse, of telegraph signals. (PE) 599-1985w

(2) A distortion in the end of all marking pulses of start-stop teletypewriter signals from their proper positions in relation to the beginning of the start pulse. (C) 610.7-1995

end finger (rotating machinery) (outside space-block) A radially extending finger piece at the end of a laminated core to transfer pressure from an end clamping plate or flange to a tooth. *See also:* rotor; stator. (PE) [9]

end-fire array antenna A linear array antenna whose direction of maximum radiation lies along the line of the array. (AP/ANT) 145-1993

end fittings (composite insulators) The insulator attachment hardware that is connected to the core. (T&D/PE) 987-1985w

ending point (A) (for CCS outgoing trunk) Transmittal of IAM. **(B)** (for per-trunk-signaling outgoing trunk). Transmittal of connect signal to next office. *See also:* cross-office delay; starting point. (COM/TA) 973-1990

end injection (microwave tubes) A gun used in the presence of crossed electric and magnetic fields to inject an electron beam into the end of a slow-wave structure. *Synonym:* charles or kino gun. (ED) [45]

end item An entity identified with an element of the system breakdown structure. An end item is represented by one or more of the following: equipment (hardware and software), data, facilities, material, services, and/or techniques. (C/SE) 1220-1998

end mark A mark that indicates the end of a word or another unit of data. (C) 610.10-1994w

end node (local area networks) A physical device that may be attached to a LAN link segment for the purpose of transmitting and receiving information on that link medium. For example, an end node may be a user station, a bridge, or a LAN analyzer. It is identified by a unique 48-bit address. (C) 8802-12-1998

end-of-block signal (numerically controlled machines) A symbol or indicator that defines the end of one block of data. (EEC/NFPA) [74], [114]

end-of-copy signal (facsimile) A signal indicating termination of the transmission of a complete subject copy. *See also:* facsimile signal. (COM) 168-1956w

end-of-demand-interval indicator An indicator for the end of the demand interval for nonrolling-interval demand, or the end of the sub-interval for rolling-interval demand. (ELM) C12.15-1990

end-of-dialing determination The use of code interpretation and digit counting on critical interdigital timing to determine if additional dialed digits are to be expected. The critical interdigital timing interval is a specified time interval. In these cases, dialing should be considered complete if a potentially complete code has been received and if no additional character is received within the critical interdigital timing interval. It is desirable to avoid the use of timing whenever possible since this delays call completion and is a potential source of misdirected calls. (COM/TA) 973-1990w

end office (1) (telephone switching systems) A local office that is part of the toll hierarchy of World Zone 1. An end office is classified as a Class 5 office. *See also:* office class. (COM) 312-1977w

(2) Class 5 office in the North American hierarchical routing plan; a switching center where subscriber's loops are terminated and where toll calls are switched through to called lines. *Synonyms:* local exchange; wire center. *See also:* sectional center; central office; regional center; toll center; primary center. (C) 610.7-1995

(3) A switching system to which customer premises equipment is directly connected by loops. The switch connects loops to loops and loops to trunks. (COM/TA) 820-1984r

end of file (EOF) An internal label, immediately following the last record of a file, signalling the end of that file. *Synonym:* end-of-file. (C) 610.5-1990w

end-of-file *See:* end of file.

end-of-file label (EOF) An internally-recorded label that indicates the end of a file and that may contain information for use in file control. *Synonym:* trailer label. *Contrast:* beginning-of-file label. (C) 610.10-1994w

end-of-medium character A control character that is used to identify the physical end of the data medium, the end of the used portion of the medium, or the end of the wanted portion of the data recorded on the medium. (C) 610.10-1994w

end-of-message packet The last packet of a message in the data stream. (C/MM) 1284.4-2000

End_of_Packet Delimiter (EPD) In 1000BASE-X, a defined sequence of three single code-group 8B/10B ordered_sets used to delineate the ending boundary of a data transmission sequence for a single packet. (C/LM) 802.3-1998

end_of_packet marker A control character which indicates the end of a packet. *See also:* packet. (C/BA) 1355-1995

end of program (numerically controlled machines) A miscellaneous function indicating completion of workpiece. *Note:* Stops spindle, coolant, and feed after completion of all commands in the block. Used to reset control and/or machine. Resetting control may include rewinding of tape or progressing a loop tape through the splicing leader. The choice for a particular case must be defined in the format classification sheet. (IA/EEC) [61], [74]

end-of-stream delimiter (ESD) (1) (local area networks) Patterns that identify the end of an MII data stream. (C) 8802-12-1998

(2) A code-group pattern used to terminate a normal data transmission. For 100BASE-T4, the ESD is indicated by the transmission of five predefined ternary code-groups named eop1-5. For 100BASE-X, the ESD is indicated by the transmission of the code-group/T/R. For 100BASE-T2, the ESD is indicated by two consecutive pairs of predefined PAM5×5 symbols which are generated using unique Start-of-Stream Delimiter (SSD)/ESD coding rules. (C/LM) 802.3-1998

end of tape (numerically controlled machines) A miscellaneous function that stops spindle, coolant, and feed after completion of all commands in the block. *Note:* Used to reset control and/or machine. Resetting control will include rewinding of tape, progressing a loop tape through the splicing leader, or transferring to a second tape reader. The choice for a particular case must be defined in the format classification sheet. (MIL) [2]

end-of-tape marker (EOT) A marker on a magnetic tape used to indicate the end of the permissible recording area. *Note:* It might be a photoreflective strip, a unique data pattern, or a transparent section of tape. *Contrast:* beginning-of-tape marker. (C) 610.10-1994w

end of transfer status A handshake status that indicates the last data transfer of the transfer operation. *See also:* handshake status. (C/MM) 1296-1987s

end of transmission block character A transmission control character that indicates the end of a transmission block of data. *Synonyms:* block character; transmission block character. (C) 610.7-1995

end-of-volume label (EOV) (1) An internal label that precedes and initiates the beginning of the data contained in that volume. *Synonym:* volume label. (C) 610.5-1990w

(2) An internally-recorded label that indicates the end of the recording area contained in a volume. *Contrast:* beginning-of-volume label. (C) 610.10-1994w

endogenous variable A variable whose value is determined by conditions and events within a given model. *Synonym:* internal variable. *Contrast:* exogenous variable. (C) 610.3-1989w

end-on armature relay *See:* relay.

end-on relay armature An armature whose motion is in the direction of the core axis, with the pole face at the end of the core and perpendicular to this axis. (EEC/REE) [87]

endorder traversal *See:* postorder traversal.

endothermic Characterized by or formed with the absorption of heat. (DEI) 1221-1993w

end plate, rotor *See:* rotor end plate.

end-play washers (rotating machinery) Washers of various thicknesses and materials used to control axial position of the shaft. (PE) [9]

endpoint (1) A measurable response of interest in a biological experiment. (T&D/PE) 539-1990

(2) An object that is created and maintained by a communications provider and used by applications for sending and receiving data; endpoints are used by the communications providers to identify the sources and destinations of data. (C) 1003.5-1999

(3) A point at each end of a channel, line, or a circuit. (C) 610.7-1995

(4) A consumer or producer of data on a communication link. (C/MM) 1284.4-2000

end-point criterion (thermal classification of electric equipment and electrical insulation) (evaluation of thermal capability) A value of property or property degradation (either absolute or percentage change) that defines failure in a functional test. (EI) 1-1986r

end rail (rotating machinery) A rail on which a bearing pedestal can be mounted. *See also:* bearing. (PE) [9]

end ring, rotor *See:* rotor end ring.

end-scale value (electric instruments) The value of the actuating electrical quantity that corresponds to end-scale indication. *Notes:* 1. When zero is not at the end or at the electrical center of the scale, the higher value is taken. 2. Certain instruments such as power-factor meters, ohmmeters, etc., are necessarily excepted from this definition. 3. In the specification of the range of multiple-range instruments, it is preferable to list the ranges in descending order, as 750/300/150. *See also:* instrument; accuracy rating. (EEC/AII) [102]

end shield (1) (rotating machinery) A solid or skeletal structure, mounted at one end of a machine, for the purpose of providing a specified degree of protection for the winding and rotating parts or to direct the flow of ventilating air. *Note:* Ordinarily, a machine has an end shield at each end. For certain types of machine, one of the end shields may be constructed as an integral part of the stator frame. The end shields may be used to align and support the bearings, oil deflectors, and, for a hydrogen-cooled machine, the hydrogen seals. (PE) [9]

(2) (magnetrons) A shield for the purpose of confining the space charge to the interaction space. *See also:* magnetron. (ED) 161-1971w

end-shift frame (rotating machinery) A stator frame so constructed that it can be moved along the axis of the machine shaft for purposes of inspection. *See also:* stator. (PE) [9]

end station A system attached to a LAN that is an initial source or a final destination of MAC frames transmitted across that LAN. A Network layer router is, from the perspective of the LAN, an end station; a MAC Bridge, in its role of forwarding MAC frames from one LAN to another, is not an end station. (C/LM) 802.3ad-2000

end termination The termination applied to the end of the heating cable, opposite the power supply end. (IA/PC) 515.1-1995

end termination connection The termination applied to the end of a heating cable that may be heat producing, opposite where the power is supplied. (IA) 515-1997

end-to-end test (1) A test series of all performance requirements with the dc system under normal operating conditions and, as conditions permit, under contingency operating conditions. (PE/SUB) 1378-1997

(2) A test sequence to establish pass (functioning properly) or fail (not functioning properly) conditions. *Synonym:* go/no-go test. (SCC20) 1445-1998

endurance (1) (metal-nitride-oxide field-effect transistor) The number of write-high write-low cycles accumulated before any defined unacceptable changes in device properties occur. (ED) 581-1978w

(2) (metal-nitrite-oxide semiconductor arrays) The minimum number of data alteration cycles possible without catastrophic failure or degradation beyond the specified performance characteristics of any memory cell within an array. (ED) 641-1987w

(3) The ability of a reprogrammable read-only memory to withstand data rewrites and still comply with its specifications. (ED) 1005-1998

endurance limit The maximum stress a metal can withstand without failure during a specified large number (usually 10 million) cycles of stress. (IA) [59], [71]

endurance test An experiment carried out to investigate how the properties of an item are affected by the application of stresses and the elapse of time. (R) [29]

end user The person or persons who will ultimately be using the system for its intended purpose. (C/SE) 1233-1998

end user computing The performance of system development and data processing tasks by the user of a computer system. *Synonym:* user-driven computing. (C) 610.2-1987

end winding (rotating machinery) That portion of a winding extending beyond the slots. *Note:* It is outside the major flux path and its purpose is to provide connections between parts of the winding within the slots of the magnetic circuit. *See also:* stator; asynchronous machine; rotor; direct-current commutating machine. (PE) [9]

end-winding cover (rotating machinery) (winding shield) A cover to protect an end winding against mechanical damage and/or to prevent inadvertent contact with the end winding. (PE) [9]

end-winding support (rotating machinery) The structure by which coil ends are braced against gravity and electromagnetic forces during start-up (for motors), running, and abnormal conditions such as sudden short-circuit, for example, by blocking and lashings between coils and to brackets or rings. *See also:* stator. (PE) [9]

end-window counter tube (radiation) A counter tube designed for the radiation to enter at one end. *See also:* anticoincidence. (ED) [45]

end-wire insulation (rotating machinery) Insulation members placed between the end wires of individual coils such as between main and auxiliary windings. *See also:* rotor; stator. (PE) [9]

end wire, winding *See:* winding end wire.

energization test Any test requiring that system voltage be applied to the equipment. (SUB/PE) 1303-1994

energized (1) (conductor stringing equipment) (power line maintenance) Electrically connected to a source of potential difference, or electrically charged so as to have a potential different from that of the ground. *Synonyms:* alive; hot; live. *See also:* alive.

(T&D/PE) 524a-1993r, 1048-1990, 516-1995, C2.2-1960, 524-1992r

(2) Electrically connected to a source of potential difference, or electrically charged so as to have a potential significantly different from that of earth in the vicinity. *Synonym:* alive; live. (NESC) C2-1997

energized background noise level (1) (liquid-filled power transformers) (dry-type transformers) Stated in pC (one pC = 10^{-12} Coulombs), the residual response of the partial discharge measurement system to background noise of any nature after the test circuit has been calibrated and the test object is energized at 50% of its nominal operating voltage. (PE/TR) C57.113-1988s, C57.124-1991r

(2) Stated in pC, the residual response of the partial discharge measurement system to background noise of any nature after the test circuit has been calibrated and energized at 100% of the test voltage without the test object connected. (SWG/PE) 1291-1993r

energy (1) (power operations) That which does work or is capable of doing work. As used by electric utilities, it is generally a reference to electrical energy and is measured in kilowatt hours (kWh). *See also:* incremental energy cost; economy energy; dump energy; off-peak energy; net system energy; fuel replacement energy; energy loss; byproduct energy; energy control center; interchange energy; potential hydro energy; on-peak energy. (PE/PSE) 858-1987s

(2) (metering) The integral of active power with respect to time. (ELM) C12.1-1988

(3) (laser maser) (Q) The capacity for doing work. Energy content is commonly used to characterize the output from pulsed lasers and is generally expressed in joules. (LEO) 586-1980w

(4) (system) The available energy is the amount of work that the system is capable of doing. *See also:* electric energy. (Std100) 270-1966w

energy and channel pairs The energy (keV) of the corresponding channel is stored as energy-channel pairs. Each member of the pair is stored as a 16-character floating point number, with unused pairs being ASCII spaces or zeros. They are stored as ordered pairs, i.e., the first entry is the energy, the second is the channel at that energy, the third is the energy, the fourth is the channel at that energy, and then to the next record. This is intended to provide sufficient numbers of channel pairs to allow for an adequate reconstruction of the energy-channel function by the analysis program. (NPS/NID) 1214-1992r

energy and efficiency pairs The detection efficiency at the corresponding energy is stored as energy-efficiency pairs. Each member of the pair is stored as a 16-character floating point number, with unused pairs being ASCII spaces or zeros. They are stored as ordered pairs, i.e., the first entry is the energy, the second is the efficiency at that energy, the third is the energy, the fourth is the efficiency at that energy, and then to the next record. This is intended to provide sufficient numbers of efficiency pairs to allow for an adequate reconstruction of the efficiency function by the analysis program. (NPS/NID) 1214-1992r

energy and resolution pairs The detector resolution at the corresponding energy is stored as energy-resolution pairs. Each member of the pair is stored as a 16-character floating point number, with unused pairs being ASCII spaces or zeros. They are stored as ordered pairs, i.e., the first entry is the energy, the second is the resolution at that energy, the third is the energy, the fourth is the resolution at that energy, and then to the next record. This is intended to provide sufficient numbers of resolution pairs to allow for an adequate reconstruction of the resolution function by the analysis program. (NPS/NID) 1214-1992r

energy and torque (International System of Units (SI)) The vector product of force and moment arm is widely designated by the unit newton meter. This unit for bending moment of torque results in confusion with the unit for energy, which is also newton meter. If torque is expressed as newton meter per radian, the relationship to energy is clarified, since the product of torque and angular rotation is energy:

$$(\mathrm{N \cdot m/rad}) \cdot \mathrm{rad} = \mathrm{N \cdot m}$$

See also: units and letter symbols. (QUL) 268-1982s

energy calibration (sodium iodide detector) The relationship between the height of the amplifier output pulse and the energy of the photons originating in the radioactive source. (NI) N42.12-1994

energy calibration coefficients The energy (E) (in units of keV) versus channel number (Ch) coefficients as

$$E = A + B \cdot Ch + C \cdot Ch^2 + D \cdot Ch^3$$

with the coefficients, A, B, C, and D stored as four successive 14-character numbers including the decimal point. Leading spaces are interpreted as zeros. Any values not used or calculated should be set to all spaces. The A term is usually called the offset or zero intercept. The B term is usually called the slope of the energy-channel curve. The C term is called the quadratic component of the energy-channel curve. The D term is called the cubic component of the energy-channel curve. (NPS/NID) 1214-1992r

energy capacity The energy, usually expressed in watthours (Wh), that a fully charged battery can deliver under specified conditions. (PV) 1013-1990, 1144-1996

energy charge (1) The charge for electric service based upon the electric energy delivered or billed. (PE/PSE) 858-1993w

(2) (electric power utilization) That portion of the charge for electric service based upon the electric energy consumed or billed. (PE/PSE) 346-1973w

energy consumption Telecommunications switching systems may be characterized by their peak power consumption and by their long-term average power consumption. Peak power consumption is measured in watts and will determine the size of the power plant required. Long-term average power is a measure of energy. It is measured in watthours for a period of time such as a day, a month, or a year. This will determine the air-conditioning load and the cost of energy. Energy is sometimes measured as watts per line averaged over a year. However, both peak power and energy are better described as a function of line size, traffic, and other variations in central office equipment. (COM/TA) 973-1990w

energy control center *See:* power control center.

energy cost, incremental *See:* incremental energy cost.

energy count-rate product *See:* energy rate limit.

energy density (1) (audio and electroacoustics) (point in a field) The energy contained in a given infinitesimal part of the medium divided by the volume of that part of the medium. *Notes:* 1. The term energy density may be used with prefatory modifiers such as instantaneous, maximum, and peak. 2. In speaking of average energy density in general, it is necessary to distinguish between the space average (at a given instant) and the time average (at a given point). (SP) [32]

(2) The electromagnetic energy contained in an infinitesimal volume divided by that volume. (SP/NIR) C95.1-1999

energy-density spectrum (burst measurements) (finite energy signal) The square of the magnitude of the Fourier transform of a burst. *See also:* network analysis; burst. (IT) [7]

energy dependence (radiation protection) A change in instrument response with respect to radiation energy for a constant exposure or exposure rate. (NI) N323-1978r

energy distribution (solar cells) The distribution of the flux or fluence of particles with respect to particle energy. (AES/SS) 307-1969w

energy, dump *See:* dump energy.

energy, economy *See:* economy energy.

energy efficiency (specified electrochemical process) The product of the current efficiency and the voltage efficiency. *See also:* electrochemistry. (EEC/PE) [119]

energy-equivalent sound level (L_{eq}) (1) (audible noise measurements) The equivalent sound level L_{eq} is the energy average of the level (usually A-weighted) of a varying sound over a specified period of time. The term "equivalent" sig-

nifies that the average of the fluctuating sound would have the same sound-energy level as a steady sound having the same level. The term "energy" is used because the sound amplitude is averaged on a root-mean-square (rms) pressure-squared basis, and pressure-squared is proportional to energy. Mathematically, the equivalent sound level is defined as:

$$L_{eq} = 10\log\left[\frac{1}{(t_2 - t_1)}\int_{t_1}^{t_2}\frac{p^2(t)}{p_{inf}^2}\,dt\right] \text{ dB}$$

where

$p(t)$ = The time-varying A-weighted sound level, in μPa
p_{ref} = The reference pressure, 20 μPa
$(t_2 - t_1)$ = The time period of interest

If the cumulative probability distribution of a noise is known, then L_{eq} can be estimated by:

$$L_{eq} = 10\log\left[\frac{1}{100}\sum_{0}^{n}(P_x - P_{x-1})\ \text{antilog}\frac{L_x}{10}\right] \text{ dB}$$

where

L_x = The highest noise level in each step
P_x, P_{x-1} = Selected adjacent steps along the probability scale, expressed in percent probability.

(2) The average of the sound energy level (usually A-weighted) of a varying sound over a specified period of time. *Notes:* 1. The simplest and most popular method for rating intermittent or fluctuating noise intrusions is to rely upon some measure of the average sound-level magnitude over time. The most common such average is the equivalent sound level, L_{eq}, expressed in decibels. 2. The term "equivalent" signifies that a steady sound having the same level as the L_{eq} would have the same sound energy as the fluctuating sound. The term "energy" is used because the sound amplitude is averaged on an rms-pressure-squared basis, and the square of the pressure is proportional to energy. For example, two sounds, one of which contains 24 times as much energy as the other but lasts for 1 h instead of 24 h, would have the same energy-equivalent sound level. 3. Mathematically, the equivalent sound level is defined as

$$L_{eq} = 10\log\left[\frac{1}{(t_2 - t_1)}\int_{t_1}^{t_2}\frac{p^2(t)}{p_{ref}^2}\,dt\right]$$

where

$p(t)$ = The time-varying A-weighted sound level, in μPa
p_{ref} = The reference pressure, 20 μPa
$(t_2 - t_1)$ = The time period of interest

If the cumulative probability distribution of a noise is known, then L_{eq} can be estimated by

$$L_{eq} = 10\log\left[\frac{1}{100}\sum_{0}^{n}(P_x - P_{x-1})\ \text{antilog}\frac{L_x}{10}\right]$$

where

P_x, P_{x-1} = Selected adjacent steps along the probability scale, expressed in percent (%)
L_x = The highest noise level in each step
x = The step number
n = The total number of steps

(T&D/PE) 539-1990, 656-1992

energy flux (audio and electroacoustics) The average rate of flow of energy per unit time through any specified area. *Note:* For a sound wave in a medium of density r and for a plane or spherical free wave having a velocity of propagation c, the sound-energy flux through the area S corresponding to an effective sound pressure p is

$$J = \frac{p^2 S}{\rho c}\cos\theta$$

where q is the angle between the direction of propagation of the sound and the normal to the area S. (SP) [32]

energy, fuel replacement *See:* fuel replacement energy.

energy gap (semiconductor) The energy range between the bottom of the conduction band and the top of the valence band. *See also:* semiconductor device. (ED) 216-1960w

energy, interchange *See:* interchange energy.

energy-limiting transformer (power and distribution transformers) A transformer that is intended for use on an approximately constant-voltage supply circuit and that has sufficient inherent impedance to limit the output current to a thermally safe maximum value. *See also:* specialty transformer. (PE/TR) C57.12.80-1978r, [57]

energy loss (power operations) The difference between energy input and output as a result of transfer of energy between two points. (T&D/PE/PSE) 858-1993w, 346-1973w

energy metering point (electric power system) For a tie line, the actual or equivalent location of a power flow measurement that is integrated to produce an energy transfer value. (PE/PSE) 94-1991w

energy, net system *See:* net system energy.

energy, nuclear *See:* nuclear energy.

energy, off-peak *See:* off-peak energy.

energy, on-peak *See:* on-peak energy.

energy, partial discharge *See:* partial discharge energy.

energy, potential hydro *See:* potential hydro energy.

energy, Q *See:* Q energy.

energy rate The average energy per event times the number of events per second. (NPS) 325-1996

energy rate limit In a preamplifier dc-coupled to a detector, the highest energy rate in units of MeV per second that causes no more than a specified fraction of the pulses (usually 1%) to overload the preamplifier. (NPS) 325-1996

energy ratio The ratio of signal energy to noise power spectral density in the receiver, at a point where the noise factor has been established and prior to filtering that would exclude components of the input signal. *Note:* Energy ratio also equals the maximum output signal-to-noise power ratio for a matched-filter system. (AES) 686-1997

energy resolution (1) (A) In keV: the FWHM of a spectral line in units of keV. **(B)** In percent: $100 \cdot (\text{FWHM}/E)$ where FWHM and energy E are expressed in the same units. *See also:* full width at half maximum. (NPS) 300-1988

(2) (full width at half maximum) (fwhm) (x-ray energy spectrometers) (of a semiconductor radiation detector) The detector's contribution (including detector leakage current noise), expressed in units of energy, to the FWHM of a pulse-height distribution corresponding to an energy spectrum. (NPS/NID) 759-1984r

(3) One hundred times the energy resolution divided by the energy for which the resolution is specified. (NPS/NID) 759-1984r, 301-1976s

(4) The full width at half maximum of a peak in a spectrum *f* after subtracting the background under the peak *f* expressed in units of energy, usually keV, or as a percentage of the energy corresponding to that peak. (NPS) 325-1996

energy resolution, full width at half-maximum (fwhm) The width of a peak at half of the maximum peak height with the baseline removed. (NI) N42.14-1991

energy resolution, full width at tenth maximum (full width at half maximum) The width of a peak at one-tenth of the maximum peak height with the baseline removed. [For a normal (Gaussian) distribution, FWTM is 1.823 times its FWHM]. (NI) N42.14-1991

energy (shock) absorber A component whose primary function is to dissipate energy and limit deceleration forces which the system imposes on the body during fall arrest. Such devices may employ various principles such as deformation, friction, tearing of materials or breaking of stitches to accomplish energy absorption. An energy absorber causes an increase in the deceleration distance. An energy absorber may be borne by the user (personal) or be a part of a horizontal lifeline subsystem or a vertical lifeline subsystem. (T&D/PE) 1307-1996

energy spectrum A differential distribution of the intensity of radiation as a function of energy. (NPS) 325-1996

energy straggling (1) (semiconductor radiation detectors) The random fluctuations in energy loss whereby those particles having the same initial energy lose different amounts of energy when traversing a given thickness of matter. (This process may lead to the broadening of spectral lines.) (NPS/NID) 325-1996, 300-1988r, 301-1976s

(2) *See also:* energy straggling. (NPS) 300-1988r

engine A dedicated processor, architecture, or system component that is used for a single and special purpose; for example, an inferencing co-processor (inferencing engine), floating-point processor, a print engine in a laser printer, or a database engine (software engine). (C) 610.10-1994w

engine-driven generator for aircraft A generator mechanically, hydraulically, or pneumatically coupled to an aircraft propulsion engine to provide power for the electric and electronic systems of an aircraft. It may be classified as follows: 1) Engine-mounted; 2) Remote-driven; A) Flexible-shaft-driven; B) Variable- ratio-driven; C) Air-turbine-driven. (EEC/PE) [119]

engine equilibrium temperature (1) (periodic testing of diesel-generator units applied as standby power supplies in nuclear power generating stations) The condition at which the jacket water and lube oil temperatures are both within ± 10°F (5.5°C) of their normal operating temperatures established by the engine manufacturer. (PE/NP) 749-1983w

(2) The condition at which the jacket water and lube oil temperatures are both within ± 5.5°C (10°F) of their normal operating temperatures established by the engine manufacturer. (PE/NP) 387-1995

engineered safety features (nuclear power generating station) Features of a unit, other than reactor trip or those used only for normal operation, that are provided to prevent, limit, or mitigate the release of radioactive material. 627-1980r, 308-1991

engineered system A fall protection system which is designed and will operate to withstand the maximum expected impact load while maintaining a specified overload capacity factor (OCF). (T&D/PE) 1307-1996

engineering The application of a systematic, disciplined, quantifiable approach to structures, machines, products, systems, or processes. (C) 610.12-1990

engineering change In configuration management, an alteration in the configuration of a configuration item or other designated item after formal establishment of its configuration identification. *Contrast:* deviation. *See also:* waiver; configuration control; engineering change proposal. (C) 610.12-1990

engineering change proposal In configuration management, a proposed engineering change and the documentation by which the change is described and suggested. *See also:* configuration control. (C) 610.12-1990

engineering units (O/M) (1) (supervisory control, data acquisition, and automatic control) A unit of physical measurement (e.g., volts, amperes). (PE/SUB) C37.1-1994

(2) A unit of measure for use by operating/maintenance personnel usually provided by scaling the input quantity for display (meter, stripchart, or crt). (SWG/PE) C37.100-1992

engine-generator system (electric power supply) A system in which electric power for the requirements of a railway vehicle (other than propulsion) is supplied by an engine-driven generator carried on the vehicle, either as an independent source of electric power or supplemented by a storage battery. *See also:* axle-generator system. (PE/EEC) [119]

engine-room control Apparatus and arrangement providing for control in the engine room, on order from the bridge, of the speed and direction of a vessel. (EEC/PE) [119]

engine synchronism indicator A device that provides a remote indication of the relative speeds between two or more engines. (EEC/PE) [119]

engine-temperature thermocouple-type indicator A device that indicates temperature of an aircraft engine cylinder by measuring the electromotive force of a thermocouple. (EEC/PE) [119]

engine-torque indicator A device that indicates engine torque in pound-feet. *Note:* It is usually converted to horsepower with reference to engine revolutions per minute. (EEC/PE) [119]

English language programming (test, measurement, and diagnostic equipment) A technique of programming which allows the programmer to write programs and routines in English language statements. (MIL) [2]

English unit of luminance (illuminating engineering) (USA unit of luminance) Candela per square foot(cd/ft^2) also lumen per steradian, square foot ($lm/(sr \times ft^2)$). Another unit is candela per square inch (cd/in^2); also, lumen per steradian, square inch ($lm/(sr \times in^2)$). *See also:* lambert; footlambert; lambertian units of luminance. (EEC/IE) [126]

enhanced backscatter Stronger than expected backscattered signal due to resonant surface or internal waves in the target region. (AP/PROP) 211-1997

enhanced parallel port mode (EPP mode) An asynchronous, byte-wide, bidirectional channel controlled by the host device. This mode provides separate address and data cycles over the eight data lines of the interface. (C/MM) 1284-1994

enhanced service provider (ESP) A service provider offering services through the telephone network using the telemetry transport capabilities to deliver their services. (AMR/SCC31) 1390-1995, 1390.2-1999, 1390.3-1999

enhanced small device interface (ESDI) A data-transfer interface characterized by improved seek times and greater throughput than its predecessor, the ST-506 interface. (C) 610.10-1994w

enhanced solar radiation (radio-wave propagation) The electromagnetic radiation of the sun under other than quiet conditions. *See also:* quiet sun. (AP/PROP) 211-1990s

enhancement *See:* image enhancement.

enhancement mode transistor (metal-nitride-oxide field-effect transistor) An insulated-gate field effect transistor (IGFET) where the channel connecting source and drain was formed by the effects of an applied gate voltage. (ED) 581-1978w

enqueue To append an item to a queue. *Contrast:* dequeue. (C) 610.5-1990w

enter key A control key that signals the end of input to a computer. *See also:* carriage return key. (C) 610.10-1994w

enterprise The organization that performs specified tasks. (C/SE) 1220-1998

enterprise service (telephone switching systems) A service in which calls from certain designated exchanges are completed and billed to a number in another exchange. (COM) 312-1977w

enterprise view *See:* conceptual view.

entire RE The concatenated set of one or more BREs or EREs that make up the pattern specified for string selection. (C/PA) 9945-2-1993

Entity An instance of a subclass of `IEEE1451_Entity`. (IM/ST) 1451.1-1999

entity (1) (software) In computer programming, any item that can be named or denoted in a program. For example, a data item, program statement, or subprogram. (C) 610.12-1990

(2) (data management) A distinguishable object, either real or abstract, about which data are recorded; for example, a person such as a CUSTOMER, or a concept, such as SALES-REVENUE, about which data is stored in a data structure. *Synonym:* entity instance. (C) 610.5-1990w

(3) In an open system, an element in a hierarchical division. *Note:* It has attributes that describe it, a name that identifies it, and an interface that provides management operations. (C) 610.7-1995

(4) A group of like items or subjects that can be individually identified and about which information is recorded. Examples include cable, drawing, modification, and system. *Synonym:* entity set. (PE/EDPG) 1150-1991w

(5) An active element in an open system. (C/LM) 802.10g-1995

(6) Any component in a system that requires explicit representation in a model. Entities possess attributes denoting specific properties. *See also:* simulation entity. (C/DIS) 1278.3-1996

(7) (A) The representation of a concept, or meaning, in the minds of the people of the enterprise. **(B)** The representation of a set of real or abstract things (people, objects, places, events, ideas, combination of things, etc.) that are recognized as the same type because they share the same characteristics and can participate in the same relationships. (C/SE) 1320.2-1998

(8) Signifies the hardware/software embodiment of an object. (IM/ST) 1451.1-1999

(9) Anything of interest (such as a person, place, process, property, object, concept, association, state, or event) within a given domain of discourse (in this case, within the ITS domain of discourse). (SCC32) 1489-1999

(10) *See also:* simulation entity. (DIS/C) 1278.1-1995

entity attribute (1) A named characteristic or property of a design entity that provides a systematic procedure for the statement of fact about the entity. (C/SE) 1016.1-1993w

(2) A named characteristic or property of a design entity. It provides a statement of fact about the entity. (C/SE) 1016-1998

entity/attribute matrix A representation of a relation in the form of a matrix such that each row represents an entity and each column represents an attribute of the entity.

attributes → R

No.	Name	Grade	Homeroom
15	Mary	4	26A
20	Joe	6	43
21	Harry	4	27
27	Michael	5	25
30	Susan	5	25
42	Mickey	6	41

entity ↓

students

entity/attribute matrix

(C) 610.5-1990w

entity class *See:* entity set.

entity coordinate system A system whereby location with respect to a simulation entity is described by an entity coordinate system. (DIS/C) 1278.1-1995

entity instance One of a set of real or abstract things represented by an entity. Each instance of an entity can be specifically identified by the value of the attribute(s) participating in its primary key. (C/SE) 1320.2-1998

entity layer In the OSI model, one of a collection of network-processing functions representing a level of a hierarchy of functions. *See also:* session layer; logical link control sublayer; client layer; physical layer; application layer; client layer; entity layer; presentation layer; sublayer; data link layer; network layer; transport layer; medium access control sublayer. (C) 610.7-1995

entity-relationship *See:* entity-relationship map; entity-relationship data model; entity-relationship diagram.

entity-relationship data model A logical view of data within a system, representing the entities in the system as well as relationships among the entities, attributes of the entities, and attributes of the relationships. (C) 610.5-1990w

entity-relationship diagram (E-R diagram) A diagram that depicts a set of real-world entities and the logical relationships among them. *Synonym:* entity-relationship map. *See also:* data structure diagram. (C) 610.12-1990

entity-relationship map *See:* entity-relationship diagram.

entity set A collection of entities that have similar properties, such as a set of CUSTOMERS. *Synonyms:* entity type; entity class. (C) 610.5-1990w

entity type The construct used to represent an entity in Intelligent Transportation Systems (ITS) data dictionaries. (SCC32) 1489-1999

entrance *See:* routine entry point.

entrance terminal (for distribution oil cutouts) (distribution oil cutouts) A terminal with an electrical connection to the fuse contact and suitable insulation where the connection passes through the housing. (SWG/PE) C37.40-1993, C37.100-1992

entrant A live inserted module in the process of aligning itself with the arbitration protocol. (C/BA) 10857-1994, 896.4-1993w

entry (1) (data management) An element of information in a data structure, that describes an identifiable entity; for example, a member of a table, list, or queue. *See also:* data entry. (C) 610.5-1990w

(2) A component of a directory, which is located within the node's ROM. An entry may contain information, or a pointer to another directory or leaf. *See also:* ROM. (C/MM) 1212-1991s

(3) A part of the DIB that contains information about an object. Each entry is made up of attributes. *Synonym:* object entry. (C/PA) 1328.2-1993w, 1326.2-1993w, 1224.2-1993vw, 1327.2-1993Aw

(4) (software) *See also:* routine entry point. (C) 610.12-1990

entry point identifier (label) (CAMAC system) The symbol label represents an entry point into a programmed procedure. Such a procedure will typically be executed in response to the recognition of a LAM, and it may interrupt the process being executed at the time of recogniton of the LAM. Under these circumstances the procedure must be capable of saving and restoring the state of the computer so that the interrupted process can be resumed. At least one value of labels should identify a system error procedure which deals with LAMs not linked to user processes. (NPS) 758-1979r

entry point, routine *See:* routine entry point.

enumeration The listing of the meaning associated with each binary numeric value possible in a data field's storage. Binary numbers are usually expressed in decimal terms for human convenience. Not all possible numeric values need have a specific meaning. Values without meaning are declared to be unused or reserved for future use. Enumeration is the process of declaring the encoding of human interpretable information in a manner convenient for digital electronic machine storage and interchange. The subclause that defines each transducer electronic data sheet data field that is of data type *enumeration* shall contain a table that defines the meaning of the data field for each binary number possible. The meanings encoded in each data field shall be specific and unique to that data field and only that data field. The value becomes meaningless if not associated with the data field and its defining table. (IM/ST) 1451.2-1997

enumeration type A discrete data type whose members can assume values that are explicitly defined by the programmer. For example, a data type called COLORS with possible values RED, BLUE, and YELLOW. *Contrast:* logical type; real type; integer type; character type. (C) 610.12-1990

envelope (1) (wave) (general) The boundary of the family of curves obtained by varying a parameter of the wave. For the special cas

$$y = E(t) \sin (\omega t + \theta)$$

variation of the parameter q yields $E(t)$ as the envelope. (Std100) 270-1966w

(2) (wave) (automatic control) Another wave composed of the instantaneous peak values of the original wave of an

alternating quantity, and which indicates the variation in amplitude undergone by that quantity. (PE/EDPG) [3]

envelope amplitude distribution A cumulative distribution of the impulse response positive crossing rates of a bandpass filter at different spectrum amplitudes. (EMC) C63.12-1987

envelope delay (1) The time of propagation, between two points, of the envelope of a wave. *Note:* It is equal to the rate of change with angular frequency of the difference in phase between these two points. It has significance over the band of frequencies occupied by the wave only if this rate is approximately constant over that band. If the system distorts the envelope, the envelope delay at a specified frequency is defined with reference to a modulated wave that occupies a frequency bandwidth approaching zero. *See also:* radio-wave propagation; facsimile transmission; television. (COM/PE) 168-1956w, 599-1985w

(2) The time that the envelope of a modulated signal takes to pass from one point in a network (or transmission system) to a second point in the network. *Note:* Envelope delay is often defined the same as group delay, that is, as the rate of change, with angular frequency, of the phase shift between two points in a network. *See also:* time delay; group delay time. (CAS) [13]

(3) (non-real time spectrum analyzer) The display produced on a spectrum analyzer when the resolution bandwidth is greater than the spacing of the individual frequency components. (IM) [14]

(4) (PCM telecommunications circuits and systems) The propagation time between two points for the envelope of a wave. (COM/TA) 1007-1991r

(5) The time that the envelope of a modulated signal takes to pass from one point in a network (or transmission system) to a second point in the network. Envelope delay is often defined as the rate of change, with angular frequency, of the phase shift between two points in a network. Examples of envelope delay are as follows: The time it takes the envelope of a carrier frequency amplitude modulated by 83 1/3 Hz to pass between two points in a network. The rate of change, with angular frequency, of the phase shift between adjacent pairs of tones (frequency difference of 156.25 Hz) in the 23-tone test signal. The rate of change, with angular frequency, of the phase shift measured between frequencies spaced 31.25 Hz apart in the Network Impulse Response test signal. (COM/TA) 743-1995

(6) The time of propagation of the envelope of a wave between two points provided that the envelope is not significantly distorted. *Synonym:* group delay. *See also:* group velocity. (AP/PROP) 211-1997

envelope delay distortion (EDD) (1) The difference between the envelope delay at one frequency and the envelope delay at a reference frequency, which is usually taken as the frequency of minimum envelope delay. (COM/TA) 1007-1991r

(2) (facsimile) That form of distortion which occurs when the rate of change of phase shift with frequency of a circuit or system is not constant over the frequency range required for transmission. *Note:* In facsimile, envelope delay distortion is usually expressed as one-half the difference in microseconds between the maximum and the minimum envelope delays existing between the two extremes of frequency defining the channel used. *See also:* facsimile transmission. (COM) 168-1956w

(3) The difference between the envelope delay at a test frequency and the envelope delay at a reference frequency. (COM/TA) 743-1995

(4) (general) Of a system or transducer, the difference between the envelope delay at one frequency and the envelope delay at at a reference frequency. (SP) 151-1965w

(5) *See also:* envelope delay distortion.

envelope delay, round trip *See:* round-trip envelope delay.

envelope display (spectrum analyzer) The display produced on a spectrum analyzer when the resolution bandwidth is greater than the spacing of the individual frequency components. (IM) 748-1979w

envelope, vacuum *See:* vacuum envelope.

envelope voltage (electromagnetic site survey) The magnitude of the complex representation of the observed instantaneous voltage. *Note:* Envelope voltage is always a positive quantity permitting the logarithmic operation to be performed upon the value. (EMC) 473-1985r

environment (1) The universe within which the system must operate. All the elements over which the designer has no control and that affect the system or its inputs and outputs. (SMC) [63]

(2) (Class 1E battery chargers and inverters) The external conditions and influences such as temperature, humidity, altitude, shock and vibration which may affect the life and function of the components or equipment. (PE/NP) 650-1979s

(3) (overhead power lines) The combined external factors that affect the health, growth, reproduction, and survival of an organism. (T&D/PE) 539-1990

(4) (modeling and simulation) The external objects, conditions, and processes that influence the behavior of a system. (C) 610.3-1989w

(5) The natural (weather, climate, ocean conditions, terrain, vegetation, dust, etc.) and induced (electromagnetic, interference, heat, vibration, etc.) conditions that constrain the design solutions for consumer products and their life-cycle processes. (C/SE) 1220-1994s

(6) The circumstances, objects, and conditions that surround a system to be built; includes technical, political, commercial, cultural, organizational, and physical influences as well as standards and policies that govern what a system must do or how it will do it. (C/SE) 1362-1998

(7) The circumstances, objects, and conditions that will influence the completed system; they include political, market, cultural, organizational, and physical influences as well as standards and policies that govern what the system must do or how it must do it. (C/SE) 1233-1998

(8) A concept space, i.e., an area in which a concept has an agreed-to meaning and one or more agreed-to names that are used for the concept. (C/SE) 1320.2-1998

(9) (A) A general term relating to everything that supports a system or the performance of a function. **(B)** The conditions that affect the performance of a system or function. (C) 610.12-1990

environmental application factor (reliability data for pumps and drivers, valve actuators, and valves) (reliability data) A multiplicative constant used to modify a failure rate to incorporate the effects of other normal or abnormal environments. *Note:* When available these factors are included in Appendix D of IEEE Std 500-1984 P&V in the appropriate chapter prefaces. (PE/NP) 500-1984w

environmental change of amplification (magnetic amplifier) The change in amplification due to a specified change in one environmental quantity while all other environmental quantities are held constant. *Note:* Use of a coefficient implies a reasonable degree of linearity of the considered quantity with respect to the specified environmental quantity. If significant deviations from linearity exist within the environmental range over which the amplifier is expected to operate, particularly if the amplification, for example, is not a monotonic function of the environmental quantity, the existence of such deviations should be noted. (MAG) 107-1964w

environmental coefficient (A) (output from a control system or element having a specified input). The ratio of a change of output to the change in the specified environment (temperature, pressure, humidity, vibration, etc.), measured from a specified reference level, which causes it; in a linear system, it includes the "coefficient of sensitivity," and the "coefficient of zero error." **(B)** (sensitivity). The ratio of a change in sensitivity to the change in the specified environment (measured from a specified reference level) which causes it. **(C)** (zero

error). The ratio of a change in zero error to the change in the specified environment (measured from a specified reference level) which causes it. (CS/PE/EDPG) [3]

environmental coefficient of amplification (magnetic amplifier) The ratio of the change in amplification to the change in the specified environmental quantity when all other environmental quantities are held constant. *Note:* The units of this coefficient are the amplification units per unit of environmental quantity. (MAG) 107-1964w

environmental coefficient of offset (magnetic amplifier) The ratio of the change in quiescent operating point to the change in the specified environmental quantity when all other environmental quantities are held constant. *Note:* The units of this coefficient are the output units per unit of environmental quantity. (MAG) 107-1964w

environmental coefficient of trip-point stability (magnetic amplifier) The ratio of the change in trip point to the change in the specified environmental quantity when all other environmental quantities are held constant. *Notes:* 1. The units of this coefficient are the control signal units per unit of environmental quantity. 2. Use of a coefficient implies a reasonable degree of linearity of the considered quantity with respect to the specified environmental quantity. If significant deviations from linearity exist within the environmental range over which the amplifier is expected to operate, particularly if the amplification, for example, is not a monotonic function of the environmental quantity, the existence of such deviations should be noted. (MAG) 107-1964w

environmental conditions (electric penetration assemblies) Physical service conditions external to the electric penetration assembly such as ambient temperature, pressure, radiation, humidity, vibration, chemical or demineralized water spray and submergence expected as a result of normal operating requirements, and postulated conditions appropriate for the design basis events applicable to the electric penetration assembly. (PE/NP) 317-1983r

environmental dispatch control An automatic generation control subsystem that allocates unit generation levels within a control area based upon environmental considerations. (PE/PSE) 94-1991w

environmental impact A change in existing conditions due to a natural or artificial cause, whether beneficial or adverse, that affects an organism and its surroundings. (T&D/PE) 539-1990

environmental loss time The part of down-time that is due to a fault in the computer environment. *Synonym:* external loss time. (C) 610.10-1994w

environmental offset (magnetic amplifier) The change in quiescent operating point due to a specified change in one environmental quantity (such as line voltage) while all other environmental quantities are held constant. (MAG) 107-1964w

environmental radio noise (control of system electromagnetic compatibility) The total electromagnetic disturbance complex in which an equipment, subsystem, or system may be immersed, exclusive of its own electromagnetic contribution. (EMC) C63.12-1987

environmental seal (Class 1E connection assemblies) A device or system that restricts the passage of a gas or liquid through a boundary in conjunction with related cables or wires as an assembly. This does not include fire stops, in-line splices, or containment electric penetrations. (PE/NP) 572-1985r

environmental simulation (modeling and simulation) A simulation that depicts all or part of the natural or man-made environment of a system; for example, a simulation of the radar equipment and other tracking devices that provide input to an aircraft tracking system. (C) 610.3-1989w

environmental temperature (separable insulated connectors) The temperature of the surrounding medium, such as air, water, and earth, into which the heat of the connector is dissipated directly, including the effect of heat dissipation from associated cables and apparatus. (T&D/PE) 386-1995

environmental trip-point stability (magnetic amplifier) The change in the magnitude of the trip point (either trip OFF or trip ON, as specified) control signal due to a specified change in one environmental quantity (such as line voltage) while all other environmental quantities are held constant. (MAG) 107-1964w

environment glossary *See:* glossary.

environment task The anonymous task whose execution elaborates the library items of the declarative part of an active partition, and then calls the main subprogram, if there is one. (C) 1003.5-1999

environs (radiological monitoring instrumentation) The uncontrolled area at or near the site boundary. (NI) N320-1979r

EOF *See:* end-of-file label; end of file.

EOL-3 *See:* Expression-Oriented Language 3.

EOT *See:* end-of-tape marker.

EOV *See:* end-of-volume label.

EPC-40 Electrical plastic conduit for type II applications, fabricated from PE; or for type II and III applications, fabricated from PVC. (SUB/PE) 525-1992r

EPC-80 Electrical plastic conduit for type IV applications, fabricated from PVC. (SUB/PE) 525-1992r

EPD *See:* echo path delay.

ephapse The electric junction of two parallel or crossing nerve fibers at which there may occur phenomena similar to those occurring at a synapse. (EMB) [47]

ephemeris (communication satellite) The position vector of a satellite or spacecraft in space with respect to time. (COM) [19]

epidemiology The study of the frequency and distribution of a disease, or a physiological condition in human populations, and of the factors that influence its frequency and distribution. (T&D/PE) 539-1990

epilog breakpoint A breakpoint that is initiated upon exit from a given program or routine. *Synonym:* postamble breakpoint. *Contrast:* prolog breakpoint. *See also:* data breakpoint; code breakpoint; static breakpoint; programmable breakpoint; dynamic breakpoint. (C) 610.12-1990

EPL *See:* echo path loss.

E-plane bend (waveguide components) A waveguide bend (corner) in which the longitudinal axis of the guide remains in a plane parallel to the electric field vector throughout the bend (corner). (MTT) 147-1979w

E-plane line A rectangular waveguide containing one or more planar conducting structures, with or without dielectric backings, which are oriented in the plane defined by the electric field and the direction of propagation of the dominant waveguide mode. The guiding structures consist of one or more thin conducting strips, each having one edge extending to the broad wall of the enclosure. (MTT) 1004-1987w

E-plane, principal *See:* principal E-plane.

E-plane tee junction (waveguide components) (series tee) A waveguide tee junction in which the electric field vector of the dominant mode in each arm is parallel to the plane of the longitudinal axes of the guides. (MTT) 147-1979w

Epoch (1) The time 0 hours, 0 minutes, 0 seconds, January 1, 1970, Coordinated Universal Time. *See also:* seconds since the Epoch. (C/PA) 9945-2-1993, 9945-1-1996

(2) A base reference time defined as 0 hours, 0 minutes, 0.0 seconds, 1 January 1970, Universal Coordinated Time. (C) 1003.5-1999

epoch (1) A base reference time defined as 0 hours, 0 minutes, 0.0 seconds, 1 January 1970, Universal Coordinated Time. (C/PA) 1003.5b-1995

(2) The reference time defining the origin of the time scale used in a particular measurement. (IM/ST) 1451.1-1999

EPROM *See:* erasable programmable read-only memory.

EPT Electrical plastic tubing for type I applications, fabricated from PVC. (SUB/PE) 525-1992r

equal-energy source (light) (television) A light source from which the emitted power per unit of wavelength is constant throughout the visible spectrum. (BT/AV) 201-1979w

equal interval (isophase) light (illuminating engineering) A rhythmic light in which the light and dark periods are equal. (EEC/IE) [126]

equal interval quantizing A quantization technique in which the range of gray levels in an image is divided into intervals of equal length and the quantization level assigned to each pixel is the same for all pixels whose original gray levels fall within the same interval. *Synonym:* linear quantizing. (C) 610.4-1990w

equality *See:* equivalence.

equality relation A VHDL relational expression in which the relational operator is =. (C/DA) 1076.3-1997

equalization (1) (transmission performance of telephone sets) The function a telephone set performs when it automatically adjusts transmitting or receiving, or both, so as to compensate for loop loss. (COM/TA) 269-1983s

(2) (data transmission) The process of reducing frequency or phase distortion, or both, of a circuit by the introduction of networks to compensate for the difference in attenuation or time delay, or both, at the various frequencies in the transmission band. (PE) 599-1985w

(3) (feedback control system) Any form of compensation used to secure a closed-loop gain characteristic which is approximately constant over a desired range of frequencies. *See also:* compensation. (PE/EDPG) [3]

(4) (broadband local area networks) A technique used to modify the frequency response of an amplifier or network to compensate for variations in the frequency response across the network bandwidth. The ideal result is a flat overall response. This slope compensation is often done by a module within an amplifier enclosure. (LM/C) 802.7-1989r

(5) The process of reducing the frequency and/or phase distortion of a circuit to compensate for the difference in attenuation and/or delay distortion. (C) 610.7-1995

(6) (electroacoustics) *See also:* frequency-response equalization.

equalizer (1) (substation grounding) A device to provide equipotential planes for resistance measurements. (SUB/PE) 837-1989r

(2) (rotating machinery) A connection made between points on a winding to minimize any undesirable potential voltage between these points. *See also:* direct-current commutating machine; asynchronous machine. (PE) [9]

(3) A device, such as a capacitor or resistor, inserted in a transmission line to improve its frequency response and thus compensate for distortion introduced by transmission facilities. (C) 610.7-1995

equalizer circuit breaker (power system device function numbers) A breaker that serves to control or to make and break the equalizer or the current-balancing connections for a machine field, or for regulating equipment, in a multiple-unit installation. (SUB/PE) C37.2-1979s

equalize voltage A voltage approximately 10% higher than the float voltage. This higher voltage is used for periodic equalizing of lead-acid and nickel-cadmium batteries. Equalize voltage is expressed in volts/cell. (IA/PSE) 602-1996

equalizing charge (1) (storage battery) (storage cell) An extended charge to a measured end point that is given to a storage battery to insure the complete restoration of the active materials in all the plantes of all the cells. *See also:* charge. (PE/EEC) [119]

(2) A prolonged charge, at a rate higher than the normal float voltage, to correct any inequalities of voltage and specific gravity that may have developed between the cells during service. (SCC29) 485-1997

equalizing pulses (pulse terminology) Pulse trains in which the pulse-repetition frequency is twice the line frequency and that occur just before and just after a vertical synchronizing pulse. *Note:* The equalizing pulses minimize the effect of line-frequency pulse on the interlace. (IM/WM&A) 194-1977w

equalizing resistor The resistor connected across the circuit element to equalize the off state voltage across elements that are connected in series. (IA/ID) 995-1987w

equalizing voltage The voltage, higher than float, applied to a battery to correct inequalities among battery cells (voltage or specific gravity) that may develop in service. (PE/SCC21/EDPG) 450-1995, 937-2000

equal-level crosstalk coupling loss The path loss measured between points at the same transmission level on the disturbing and disturbed circuits. *See also:* crosstalk. (COM/TA) 973-1990w

equal level echo path loss (ELEPL) The measure of echo path loss at a four-wire interface that is corrected by the difference in dB, between the transmit and receive TLPs. (COM/TA) 743-1995

equally tempered scale A series of notes selected from a division of the octave (usually) into 12 equal intervals, with a frequency ratio between any two adjacent notes equal to the twelfth root of two.

Equally Tempered Intervals

Name of Interval	Frequency Ratio	Cents
Unison	1:1	0
Minor Second or Semitone	1.059463:1	100
Major Second or Whole Tone	1.122462:1	200
Minor Third	1.189207:1	300
Major Third	1.259921:1	400
Perfect Fourth	1.334840:1	500
Augmented Fourth / Diminished Fifth	1.414214:1	600
Perfect Fifth	1.498307:1	700
Minor Sixth	1.587401:1	800
Major Sixth	1.681793:1	900
Minor Seventh	1.781797:1	1000
Major Seventh	1.887749:1	1100
Octave	2:1	1200

(SP) [32]

*The frequency ratio is $[(2)^{1/12}]^n$ where n equals the number of the interval. (The number of the interval is its value in cents divided by 100.)

equal probability quantizing A quantization technique in which the range of gray levels in an image is divided into contiguous intervals such that the frequency of occurrence of each quantization level is the same. (C) 610.4-1990w

equal vectors Two vectors are equal when they have the same magnitude and the same direction. (Std100) 270-1966w

equation *See:* computer equation.

equational format (pulse measurement) One or more algebraic equations which specify a waveform wherein, typically, a first equation specifies the waveform from t_0 to t_1, a second equation specifies the waveform from t_1 to t_2, etc. The equational format is typically used to specify hypothetical, ideal, or reference waveforms. (IM/WM&A) 181-1977w

equatorial orbit (communication satellite) An inclined orbit with an inclination of zero degrees. The plane of an equatorial orbit contains the equator of the primary body. (COM) [19]

equiasymptotic stability Asymptotic stability where the rate of convergence to zero of the perturbed-state solution is independent of all initial states in some region $\|\Delta x(t_0)\| \leq v$. *See also:* control system. (CS/IM) [120]

equilibrium *See:* steady state.

equilibrium condition *See:* final condition.

equilibrium coupling length *See:* equilibrium length.

equilibrium electrode potential A state electrode potential when the electrode and electrolyte are in equilibrium with respect to a specified electrochemical reaction. *See also:* electrochemistry. (EEC/PE) [119]

equilibrium length (fiber optics) For a specific excitation condition, the length of multimode optical waveguide necessary to attain equilibrium mode distribution. *Note:* The term is sometimes used to refer to the longest such length, as would result from a worst-case, but undefined excitation. *Synonyms:* equilibrium coupling length; equilibrium mode distribution length. *See also:* mode coupling; equilibrium mode distribution. (Std100) 812-1984w

equilibrium mode distribution (fiber optics) The condition in a multimode optical waveguide in which the relative power distribution among the propagating modes is independent of length. *Synonym:* steady-state condition. *See also:* mode coupling; equilibrium length; mode. (Std100) 812-1984w

equilibrium mode distribution length *See:* equilibrium length.

equilibrium mode simulator (fiber optics) A device or optical system used to create an approximation of the equilibrium mode distribution. *See also:* mode filter; equilibrium mode distribution. (Std100) 812-1984w

equilibrium point A point in state space of a system where the time derivative of the state vector is identically zero. *See also:* control system. (CS/PE/EDPG) [3]

equilibrium potential The electrode potential at equilibrium. (IA) [59]

equilibrium reaction potential The minimum voltage at which an electrochemical reaction can take place. *Note:* It is equal to the algebraic difference of the equilibrium potentials of the anode and cathode with respect to the specified reaction. It can be computed from the free energy of the reaction. Thus,

$$\Delta F = -nFE$$

where ΔF is the free energy of the reaction, n is the number of chemical equivalents involved in the reaction, F is the value of the Faraday expressed in calories per volt gram-equivalent (23 060.5) and E is the equilibrium reaction potential (in volts). *See also:* electrochemistry. (EEC/PE) [119]

equilibrium temperature (thyristor power converter) The steady-state temperature reached by a component of a thyristor converter under specified conditions of load and cooling. *Note:* The steady-state temperatures are, in general, different for different components. The times necessary to establish steady-state temperatures are also different and proportional to the thermal time constants. (IA/IPC) 444-1973w

equilibrium voltage *See:* storage-element equilibrium voltage; storage tube.

equiphase surface Any surface over which the field vectors of a time harmonic wave have the same phase. (AP/PROP) 211-1997

equiphase zone (navigation aid terms) The region in space within which difference in phase of two radio signals is indistinguishable. (AES/GCS) 172-1983w

equipment (1) (nuclear power generating station) An assembly of components designed and manufactured to perform specific functions. *Note:* Examples of equipment are motors, transformers, valve operators, and instrumentation and control devices. (PE/NP) 323-1974s

(2) (safety systems equipment in nuclear power generating stations) An assembly of components designed and manufactured to perform specific functions. *Note:* Certain items which satisfy the definition of the term equipment as used in IEEE Std 627-1980 are those referred to as components in the ASME Boiler and Pressure Vessel Code and its latest addenda, Section III (IEEE BPV-III), for example, pumps and valves. Other examples of equipment are motors, transformers, and instrumentation and control devices. Structures and structural support items are not included in the definition of equipment. (PE/NP) 627-1980r

(3) (power and distribution transformers) A general term including material, fittings, devices, appliances, fixtures, apparatus, and the like, as a part of, or in connection with, an electrical installation. (NEC/NESC/PE/TR) C57.12.80-1978r, [86]

(4) A general term relating to devices and functional units that are part of an electrical installation. (C) 610.10-1994w

(5) A general term including fittings, devices, appliances, fixtures, apparatus, and similar terms used as part of or in connection with an electric supply or communications system. (NESC) C2-1997

equipment bonding jumper The connection between two or more portions of the equipment grounding conductor. (NESC/NEC) [86]

equipment certification An act or process resulting in documentation that attests to product performance. (T&D/PE) 1307-1996

equipment ground (1) (general) A ground connection to noncurrent-carrying metal parts of a wiring installation or of electric equipment, or both. *See also:* ground. (T&D/PE) [10]

(2) For the purposes of IEEE Std 1050-1996, it is the safety ground connection to the conductive, non current-carrying parts of electrical equipment. (PE/EDPG) 1050-1996

equipment grounding conductor (1) The conductor used to connect the non-current-carrying metal parts of equipment, raceways, and other enclosures to the service equipment, the service power source(s) ground, or both. (PE/SPD/EDPG) 665-1995, C62.45-1992r

(2) The conductor used to connect the non-current-carrying parts of conduits, raceways, and equipment enclosures to the grounding electrode at the service equipment (main panel) or secondary of a separately derived system (e.g., isolation transformer). (IA/PSE) 1100-1999

equipment noise (sound recording and reproducing system) The noise output that is contributed by the elements of the equipment during recording and reproducing, excluding the recording medium, when the equipment is in normal operation. *Note:* Equipment noise usually comprises hum, rumble, tube noise, and component noise. *See also:* noise. 191-1953w

equipment number (telephone switching systems) A unique, physical or other identification of an input or output termination of a switching network. (COM) [48]

equipment of the fixed preferential type Equipment in which the original source always serves as the preferred source and the other source as the emergency source. The automatic transfer equipment will restore the load to the preferred source upon its reenergization. (SWG/PE) C37.100-1992

equipment of the nonpreferential type Equipment that automatically restores the load to the original source only when the other source, to which it has been connected, fails. (SWG/PE) C37.100-1992

equipment of the selective preferential type Equipment in which either source may serve as the preferred or the emergency source of preselection as desired, and that will restore the load to the preferred source upon its reenergization. (SWG/PE) C37.100-1992

equipment outage (relay systems) The electrical isolation of equipment from the electric system such that it can no longer perform usefully for the duration of such isolation. *Note:* Since the term "outage" can also refer to service as well as equipment, it should always carry the appropriate modifier. (PE/PSR) C37.90-1978s

equipment qualification (1) (Class 1E battery chargers and inverters) The generation and maintenance of evidence to assure that the equipment will meet the system performance requirements. (PE/NP) 649-1980s, 650-1979s, 323-1974s

(2) The generation and maintenance of evidence to assure that the equipment will operate on demand, to meet the system performance requirements. (SWG/PE) C37.100-1992

equipment signature (test, measurement, and diagnostic equipment) The special characteristics of an equipment's response to, or reflection of, impinging impulsive energy, or of its electromagnetic, infrared or acoustical emissions. (MIL) [2]

equipment system (health care facilities) A system of feeders and branch circuits arranged for delayed, automatic or manual

connection to the alternate power source and which serves primarily three-phase power equipment. (NESC/NEC/EMB) [86], [47]

equipment under test (EUT) (1) (radio-noise emissions) A device or system used for evaluation that is representative of a product to be marketed. (EMC) C63.4-1991

(2) A representative component, unit, or system to be used for evaluation purposes. (SPD/PE) C62.45-1992r

(3) The equipment being measured or tested, as opposed to support or ancillary equipment. (EMC) 1128-1998

equipment victim The electronic equipment or subassembly that is subjected to the effects associated with an ESD event. It may be the intruder or receptor, or it may be in proximity to the discharge between the intruder and receptor and therefore subjected to the stress of ESD- related electromagnetic fields. (SPD/PE) C62.47-1992r

equipotential (conductor stringing equipment) (power line maintenance) An identical state of electrical potential for two or more items. (T&D/PE) 524a-1993r, 524-1992r, 1048-1990, 516-1995

equipotential line or contour The locus of points having the same potential at a given time. (PE/PSIM) 81-1983

equipotential work zone (area, site) A work zone (area, site) where all equipment is interconnected by jumpers, grounds, ground rods, and/or grids that will provide acceptable potential differences between all parts of the zone under worst-case conditions of energization. (T&D/PE) 524a-1993r

equisignal localizer (navigation aid terms) A localizer in which the localizer on-course line is established as an equality of the amplitudes of two signals. (AES/GCS) 172-1983w

equisignal zone The region in space within which the difference in amplitude of two radio signals (usually emitted by a single station) is indistinguishable. *See also:* radio navigation. (PE/EEC/RN) [119]

equivalence (1) (mathematics of computing) A dyadic Boolean operator having the property that if P is a statement and Q is a statement, then the equivalence of P and Q is true if and only if both statements are true or both statements are false. *Note:* The equivalence of P and Q is often represented by P≡Q.

Equivalence Truth Table

P	Q	P≡Q
0	0	1
0	1	0
1	0	0
1	1	1

Synonyms: IF-AND-ONLY-IF; exclusive NOR. (C) 1084-1986w

(2) The dyadic Boolean operation whose result has the Boolean value 1 if and only if the operands have the same Boolean value. *Synonym:* equality. *Contrast:* nonequivalence. *See also:* IF-AND-ONLY-IF gate. (C) 610.10-1994w

equivalence class A set of collating elements with the same primary collation weight. Elements in an equivalence class are typically elements that naturally group together, such as all accented letters based on the same base letter. The collation order of elements within an equivalence class is determined by the weights assigned on any subsequent levels after the primary weight. (C/PA) 9945-2-1993

equivalent binary digit(s) (1) (mathematics of computing) The number of binary digits required to represent a number expressed in another numeration system with no loss of precision. *Note:* This number is approximately 3-1/3 times the number of decimal digits. *Synonym:* equivalent binary digit factor. (C) 1084-1986w

(2) (computers) The number of binary places required to count the elements of a given set. (C) [20], [85]

equivalent binary digit factor *See:* equivalent binary digit(s).

equivalent circuit (1) (general) An arrangement of circuit elements that has characteristics, over a range of interest, electrically equivalent to those of a different circuit or device. *Note:* In many useful applications, the equivalent circuit replaces (for convenience of analysis) a more-complicated circuit or device. *See also:* network analysis. (Std100) 270-1966w

(2) (piezoelectric crystal unit) An electric circuit that has the same impedance as the unit in the frequency region of resonance. *Note:* It is usually represented by an inductance, capacitance, and resistance in series, shunted by the direct capacitance between the terminals of the crystal unit. *See also:* crystal. (PE/EEC) [119]

equivalent concentration (ion type) The concentration equal to the ion concentration divided by the valency of the ion considered. *See also:* ion. (PE/EEC) [119]

equivalent conductance (1) (acid, base, or salt) The conductance of the amount of solution that contains one gram equivalent of the solute when measured between parallel electrodes that are one centimeter apart and large enough in area to include the necessary volume of solution. *Note:* Equivalent conductance is numerically equal to the conductivity multiplied by the volume in cubic centimeters containing one gram equivalent of the acid, base, or salt. *See also:* electrochemistry. (EEC/PE) [119]

(2) (microwave gas tubes) The normalized conductance of the tube in its mount measured as its resonance frequency. *Note:* Normalization is with respect to the characteristic impedance of the transmission line at its junction with the tube mount. *See also:* electron-tube admittances; element. (ED) 161-1971w

equivalent continuous rating (rotating machinery) The statement of the load and conditions assigned to the machine for test purposes, by the manufacturer, at which the machine may be operated until thermal equilibrium is reached, and which is considered to be equivalent to the duty or duty type. (PE) [9]

equivalent contrast ($\bar{C}$) (illuminating engineering) A numerical description of the relative visibility of a task. It is the contrast of the standard visibility reference task giving the same visibility as that of a task whose contrast has been reduced to threshold when the background luminances are the same. *See also:* visual task evaluator. (EEC/IE) [126]

equivalent contrast, $\bar{C}_e$ (illuminating engineering) The actual equivalent contrast in a real luminous environment with nondiffuse illumination. The actual equivalent contrast C_e is less than the equivalent contrast due to veiling reflection. $C_e = C \times CRF$. *See also:* contrast rendition factor. (EEC/IE) [126]

equivalent core-loss resistance A hypothetical resistance, assumed to be in parallel with the magnetizing inductance, that would dissipate the same power as that dissipated in the core of the transformer winding for a specified value of excitation. (CHM) [51]

equivalent dark-current input (phototubes) The incident luminous (or radiant) flux required to give a signal output current equal to the output electrode dark current. *Note:* Since the dark current may change considerably with temperature, the temperature should be specified. *See also:* phototube. (ED) [45]

equivalent diode *See:* diode equivalent.

equivalent diode voltage *See:* composite controlling voltage.

equivalent faults Two or more faults that result in the same failure mode. (C) 610.12-1990

equivalent flat plate area of a scattering object For a given scattering object, an area equal to the wavelength times the square root of the ratio of the monostatic cross section to 4π. *Note:* A perfectly reflecting plate parallel to the incident wavefront and having this area, if it is large compared to the wavelength, will have approximately the same monostatic cross section as the object. (AP/ANT) 145-1993

equivalent 4-wire (data transmission) Use of different frequency bands to form a "high group" and "low group" for the two directions of transmission, thereby permitting operation over a single pair of conductors. (PE) 599-1985w

equivalent hours (electric generating unit reliability, availability, and productivity) The number of hours a unit was in a time category involving unit derating, expressed as equivalent hours of full outage at maximum capacity. Both unit derating and maximum capacity shall be expressed on a consistent basis, gross or net. Equivalent hours can be calculated for each of the time categories—unit derated hours, in-service unit derated hours, reserve shutdown unit derated hours, planned derated hours, in-service planned derated hours, reserve shutdown planned derated hours, unplanned derated hours, in-service unplanned derated hours, reserve shutdown unplanned derated hours, forced derated hours, in-service forced derated hours, reserve shutdown forced derated hours, maintenance derated hours, in-service maintenance derated hours, reserve shutdown maintenance derated hours, and seasonal derated hours. The symbol designation for the equivalent hours is formed by adding an E in front of the symbol for the corresponding time designation (for example, equivalent unit derated hours is designated EUNDH). Equivalent hours can be calculated from the following equation:

$$E(\ ) = \frac{\Sigma D(\ )_i T_i}{\mathrm{MC}}$$

where $E(\ )$ = equivalent hours in the time category represented by the parentheses, which can be any one of the time categories in sections 5.11 through 5.16 in IEEE Std 762-1987. D = the derating for the time category shown in parentheses, after the ith change in either available capacity (unit deratings) or dependable capacity (seasonal deratings). *Note:* In order to apportion equivalent hours among the various time categories, appropriate ground rules are established in the reporting system so that after each change in either available capacity or dependable capacity, the sum of all subcategories of unit derating is equal to the unit derating. T_i = the number of hours accumulated in the time category of interest between the ith and the $(i + 1)$th change in either available capacity (unit deratings) or dependable capacity (seasonal deratings) MC = maximum capacity.

(PE/PSE) 762-1987w

equivalent input noise sensitivity (spectrum analyzer) The average level of a spectrum analyzer's internally generated noise referenced to the input. *See also:* input signal level sensitivity; sensitivity. (IM) 748-1979w

equivalent isotropically radiated power (EIRP) In a given direction, the gain of a transmitting antenna multiplied by the net power accepted by the antenna from the connected transmitter. *Synonym:* effective isotropically radiated power.

(AP/ANT) 145-1993

equivalent load reflection coefficient *See:* reflection coefficient.

equivalent luminous intensity of an extended source at a specified distance (illuminating engineering) The intensity of a point source which would produce the same illuminance at that distance. Formerly, apparent luminous intensity of an extended source. (EEC/IE) [126]

equivalent network A network that, under certain conditions of use, may replace another network without substantial effect on electrical performance. *Note:* If one network can replace another network in any system whatsoever without altering in any way the electrical operation of that portion of the system external to the networks, the networks are said to be networks of general equivalence. If one network can replace another network only in some particular system without altering in any way the electrical operation of that portion of the system external to the networks, the networks are said to be networks of limited equivalence. Examples of the latter are networks that are equivalent only at a single frequency, over a single band, in one direction only, or only with certain terminal conditions (such as H and T networks). *See also:* network analysis. (Std100) 270-1966w

equivalent noise bandwidth (interference terminology) (signal system) The frequency interval, determined by the response-frequency characteristics of the system, that defines the noise power transmitted from a noise source of specified characteristics. *Note:* For Gaussian noise

$$\Delta f = \int_0^\infty y(f)^2 df$$

where $y(f) = Y(0)/Y(f)$ is the relative frequency dependent response characteristic. *See also:* interference. (IE) [43]

equivalent noise conductance (interference terminology) A quantitative representation in conductance units of the spectral density of a noise-current generator at a specified frequency. *Notes:* 1. The relation between the equivalent noise noise conductance G_n and the spectral density W_i of the noise-current generator is

$$G_n = \pi W_i/(kT_0)$$

where k is Boltzmann's constant and T_0 is the standard noise temperature (290 kelvins) and $kT_0 = 4.00 \times 10^{-21}$ watt-seconds. 2. The equivalent noise conductance in terms of the mean-square noise-generator current i^2 within a frequency increment δf is

$$G_n = i^2/(4kT_0\Delta f)$$

See also: electron-tube admittances. (IE/ED) [43], [45]

equivalent noise current (electron tube) (interference terminology) A quantitative representation in current units of the spectral density of a noise current generator at a specified frequency. *Notes:* 1. The relation between the equivalent noise current I_n and the spectral density W_i of the noise-current generator is

$$I_n = (2\pi W_i)/e$$

where e is the magnitude of the electron charge. 2. The equivalent noise current in terms of the mean-square noise-generator current $\overline{I}^2$ within a frequency increment δf is

$$I_n = i^2/(2e\Delta f)$$

See also: interference; signal-to-noise ratio.

(IE/ED) [43], [45]

equivalent noise input (phototubes) The value of incident luminous (or radiant) flux that, when modulated in a stated manner, produces a root-mean-square signal output current equal to the root-mean-square dark-current noise both in the same specified bandwidth (usually one hertz). *See also:* phototube. (ED) 158-1962w

equivalent noise referred to input (germanium gamma-ray detectors) (x-ray energy spectrometers) (of a linear amplifier) The value of noise at the input that would produce the same value of noise at the output as does the actual noise source. (NPS/NID) 325-1986s, 759-1984r, 301-1976s

equivalent noise resistance (1) (A) (charged-particle detectors) (parallel noise). In a hypothetically noise-free amplifier, that resistance which when placed across the input terminals of the amplifier will produce an output signal attributable to the observed parallel-noise component. This definition applies only to noise with a constant spectral density (white noise). **(B) (charged-particle detectors)** (series noise). In a hypothetically noise-free amplifier, that resistance which when connected between the signal source and the amplifier will produce an output signal attributable to the observed series-noise component. This definition applies only to noise with a constant spectral density (white noise).

(NPS) 300-1988

(2) (electron tube) A quantitative representation in resistance units of the spectral density of a noise voltage generator at a specified frequency. *Notes:* 1. The relation between the equivalent noise resistance R_n and the spectral density W_e of the noise-voltage generator is

$$R_n = (\pi W_e)/(kT_0)$$

where k is Boltzmann's constant and T_0 is the standard noise temperature (290 kelvins) and $kT_0 = 4.00 \times 10^{-21}$ watt-seconds. 2. The equivalent noise resistance in terms of the mean-square noise-generator voltage $\overline{e}^2$ within a frequency increment δf is

$R_n = \overline{e}^2/(4kT_0\Delta f)$

See also: signal-to-noise ratio; interference.

(ED) 161-1971w

equivalent noise resistance referred to input (1) (germanium gamma-ray detectors) (charged-particle detectors) (of a linear amplifier) That value of resistor which, when applied to the input of a hypothetical noiseless amplifier with the same gain and bandwidth, would produce the same output noise.

(NPS) 325-1986s

(2) (linear amplifier) (semiconductor radiation detectors) That value of resistor which when applied to the input of a hypothetical noiseless amplifier with the same gain and bandwidth would produce the same output noise.

(NID) 301-1976s

equivalent noise resistance referred to the input of an amplifier This is an ambiguous term*f*the qualifiers "series" or "parallel" must be specified. See equivalent series {parallel} noise resistance referred to the input of an amplifier.

(NPS) 325-1996

equivalent 1-megaelectronvolt electron flux The flux of electrons of 1-megaelectronvolt energy that changes a stated physical quantity (such as minority carrier diffusion length) of a given material or device to the same value as would the flux of penetrating particles of another stated energy spectrum. (AES/SS) 307-1969w

equivalent parallel circuit elements (magnetic core testing) Under stated conditions of excitation and coil configuration, the values of inductance and resistance connected parallel so that they give representation to the real permeability of the core (μ'_s) and the total losses in the core (μ''_s)

L_p, $\mu'_p L_0$

$R_p = \omega\mu''_p L_0$

$$\frac{1}{Z} = \frac{1}{j\omega L_p} + \frac{1}{R_p} = \frac{1}{j\omega\overline{\mu}L_0}$$

where

$\overline{\mu}$ = complex relative permeability
μ'_p = real complement of $\overline{\mu}$ parallel representation
μ''_p = imaginary component of $\overline{\mu}$, parallel representation
L_0 = self-inductance of coil with a core of unit relative permeability, but with the same flux distribution as with a ferromagnetic core
L_p = parallel equivalent self-inductance of the coil with a core of $\overline{\mu}$ permeability
R_p = parallel equivalent loss resistance of the core
ω = angular frequency in radians/sec.

(MAG) 393-1977s

equivalent periodic line (uniform line) A periodic line having the same electrical behavior, at a given frequency, as the uniform line when measured at its terminals or at corresponding section junctions. *See also:* transmission line.

(Std100) 270-1966w

equivalent radiated power *See:* effective radiated power.

equivalent reflection coefficient (ERC) The measure of the reflection coefficient of an actual radio-frequency (RF) absorber-lined reflecting surface. The ERC includes not only the RF absorber reflection, but other effects such as mounting fixtures, adhesive, and any air space between the RF absorber and the reflecting surface. (EMC) 1128-1998

equivalent salt-deposit density (equivalent salt-deposit density) A measure of contamination level.

(PE/T&D) 957-1995, 957-1987s

equivalent series circuit elements (magnetic core testing) Under stated conditions of excitation and coil configuration, values of a reactance and a resistance connected in series so that they give representation to the real permeability of the core (μ'_s) and to the total losses in the core (μ''_s)

$L_s = \mu'_s L_0$

$R_s = \omega\mu''_s L_0$

$Z = R_s + j\omega L_s = j\omega\overline{\mu}L_0$

where

L_s = self-inductance of oil with a core of $\overline{\mu}$ permeability; series equivalent inductance
R_s = equivalent weries resistance of coil in ohms with a core of $\overline{\mu}$ permeability
ω = angular frequency in radians/sec.

(MAG) 393-1977s

equivalent series {parallel} noise resistance referred to the input of an amplifier In a hypothetically noise-free amplifier, the value of resistor that, when connected in series with {shunted across} its input, will produce the same output noise spectrum as is observed in the real amplifier. The gain and bandwidth of the real and hypothetical amplifiers must be the same for this definition to be valid. (NPS) 325-1996

equivalent source reflection coefficient (network analyzers) The reflection coefficient equal to that caused by the source impedance Z_s

$$\Gamma_s = \frac{Z_s - Z_0}{Z_s + Z_0}$$

where the source impedance Z_s is the Thevenin impedence and is only considered in the linear range of the source. The Thevenin impedance is the impedance in Thevenin's Theorem. The impedance, Z_0, is the characteristic impedance of the transmission system. *Notes:* 1. In order to approximate a Z_0 source impedance, that is, $\Gamma_s = 0$, a directional coupler or suitable power splitter can be used as part of a feedback control circuit to maintain a constant incident power at its main-arm output port independent of the source impedance of the radio-frequency source connected to the main-arm input port of the coupler. 2. At lower frequencies, in order to approximate a Z_0 source impedance, a Z_0 impedance can be put in series with a constant voltage source that is maintained at zero impedance by means of a feedback control circuit independent of the source impedance of the radio-frequency source.

(IM/HFIM) 378-1986w

equivalent sources *See:* Huygens' sources.

equivalent sphere illumination (1) (electric power systems in commercial buildings) The measure of the effectiveness with which a practical lighting system renders a task visible compared with the visibility of the same task that is lit inside a sphere of uniform luminance. (IA/PSE) 241-1990r

(2) (illuminating engineering) The level of sphere illumination that would produce task visibility equivalent to that produced by a specific lighting environment.

(EEC/IE) [126]

equivalent test alternating voltage (charging inductors) A sinusoidal root-mean-square test voltage equal to 0.707 times the power-supply voltage of the network-charging circuit and having a frequency equal to the resonance frequency of charging. *Note:* This is the alternating component of the voltage that appears across the charging inductor in a resonance-charging circuit of the pulse forming network.

(MAG) 306-1969w

equivalent two-winding kVA rating (power and distribution transformers) The equivalent two-winding rating of multi- one-half the sum of the kVA ratings of all windings. *Note:* It is customary to base this equivalent two-winding kVA rating on the self-cooled rating of the transformer.

(PE/TR) C57.12.80-1978r

equivocation The conditional information content of an input symbol given an output symbol, averaged over all input-output pairs. *See also:* information theory. (IT) [123]

erasable programmable read-only memory (EPROM) **(1)** Same as EAROM, except erasure is implemented by exposure to ultraviolet light. (ED) 641-1987w

(2) A type of programmable read-only memory that can be erased and reprogrammed using ultraviolet light.

(C) 610.10-1994w

(3) A reprogrammable read-only memory in which all cells can be simultaneously erased using ultraviolet light and in which the cells at each address can be reprogrammed electrically. (ED) 1005-1998

(4) A type of memory chip designed to be programmed more than once, using special erasing procedures involving ultraviolet light. The processor can only read but not alter the data, considered as permanent memory. (PE/SUB) 1379-1997

erasable read-only-memory (EROM) *See:* erasable programmable read-only memory.

erasable storage A type of storage whose contents can be erased or modified. *Note:* This is generally applied only to nonvolatile storage. *Contrast:* permanent storage. (C) 610.10-1994w

erase (1) (charge-storage tubes) To reduce by a controlled operation the amount of stored information. (ED) 158-1962w, 161-1971w

(2) (computer graphics) To remove one or more display elements from the screen of a cathode ray tube. (C) 610.6-1991w

(3) In the field of electrically erasable programmable read-only memories, the removal of electrons from the floating gate of the memory cell. (ED) 1005-1998

erase algorithm The timed sequence of signals necessary to erase the memory for a flash electrically erasable programmable read-only memory (EEPROM). (ED) 1005-1998

erase character* *See:* delete character.

* Deprecated.

erase disturb The corruption of data in one location caused by the erasing of data at another location. (ED) 1005-1998

erase head Any magnetic head used to erase information from magnetic storage media. (C) 610.10-1994w

erase margin The minimum measured difference between the erased states and the sensing level for the array. (ED) 1005-1998

erase-program cycle The event of writing a memory cell from the erased state to the programmed state and back to the erased state. *Note:* This event may be used as a unit of measurement for endurance. Within a sequence, erase-program cycles are indistinguishable from program-erase cycles. *Contrast:* program-erase cycle. (ED) 1005-1998

erasing head A device for obliterating any previous magnetic recordings. *See also:* direct-current erasing head; alternating-current erasing head; permanent-magnet erasing head; phonograph pickup. (SP) [32]

erasing rate (charge-storage tubes) The time rate of erasing a storage element line or area, from one specified level to another. Note the distinction between this and erasing speed. *See also:* storage tube. (ED) 158-1962w

erasing, selective *See:* selective erasing.

erasing speed (charge-storage tubes) The linear scanning rate of the beam across the storage surface in erasing. Note the distinction between this and erasing rate. *See also:* storage tube. (ED) 158-1962w, 161-1971w

erasing time, minimum usable (storage tubes) The time required to erase stored information from one specified level to another under stated conditions of operation and without rewriting. *Note:* The qualifying adjectives minimum usable are frequently omitted in general usage when it is clear that the minimum usable erasing time is implied. *See also:* storage tube. (ED) 158-1962w

E-R diagram *See:* entity-relationship diagram.

erection (gyros) The process of aligning, by precession, a reference axis with respect to the vertical. (AES/GYAC) 528-1994

erection cut-out (gyros) The feature wherein the signal supplying the erection torque is disconnected in order to minimize vehicle maneuver effects. (AES/GYAC) 528-1994

erection or slaving rate (gyros) The angular rate at which the spin axis is precessed to a reference position. It is expressed as angular displacement per unit time. (AES/GYAC) 528-1994

E region The region of the terrestrial ionosphere between about 90 km and 150 km altitude. (AP/PROP) 211-1997

erg The unit of work and of energy in the centimeter-gram-second systems. The erg is 10^{-7} joule. (Std100) 270-1966w

Ergodic hypothesis For stationary random processes, the equivalence of spatial or temporal average with ensemble average. (AP/PROP) 211-1997

ERL *See:* echo return loss.

erlang (1) (telephone switching systems) Unit of traffic intensity, measured in number of arrivals per mean service time. For carried traffic measurements, the number of erlangs is the average number of simultaneous connections observed during a measurement period. (COM) 312-1977w

(2) (data transmission) A term used in message loading of telephone leased facilities. One erlange is equal to the number of call-seconds divided by 3600 and is equal to a fully loaded circuit over a one-hour period. (PE) 599-1985w

EROM *See:* erasable read-only-memory; erasable programmable read-only memory.

erosion (1) (composite insulators) The loss of material by leakage current or corona discharge. (T&D/PE) 987-1985w

(2) Deterioration by the abrasive action of fluids, usually accelerated by the presence of solid particles of matter in suspension. When deterioration is further increased by corrosion, the term erosion-corrosion is often used. (IA) [59]

ERP *See:* effective radiated power; ear reference point.

erroneous execution The term *erroneous execution* is used in this standard as defined in [Ada RM {1} 1.1.5]. (C/PA) 1003.5b-1995

error (1) (mathematics) Any discrepancy between a computed, observed, or measured quantity and the true, specified, or theoretically correct value or condition. *Notes:* 1. A positive error denotes that the indication of the instrument is greater than the true value. Error = Indication − True. *See also:* absolute error; correction; inherited error. (PE/EDPG) 421-1972s

(2) Any incorrect step, process, or result. *Note:* In the computer field the term commonly is used to refer to a machine malfunction as a machine error (or computer error) and to a human mistake as a human error (or operator error). Frequently it is helpful to distinguish between these errors as follows; an error results from incorrect programming, coding, data transcription, manual operation, etc., a malfunction results from a failure in the operation of a machine component such as a gate, a flip-flop, or an amplifier. *See also:* dynamic error; resolution error; electronic analog computer; loading error; linearity error; static error. (MIL/C) [2], 270-1966w, [20]

(3) (A) (analog computer) In science, the difference between the true value and a calculated or observed value. A quantity (equal in absolute magnitude to the error) added to a calculated, indicated, or observed value to obtain the true value is called a correction. **(B) (analog computer)** In a computer or data processing system, any incorrect step, process, or result. In the computer field, the following terms are commonly used: a machine malfunction is a "machine error" (or "computer error"); an incorrect program is a "program error"; and a human mistake is a "human error" (or "operator error"). Frequently it is helpful to distinguish among these errors as follows: an error results from approximations used in numerical methods or imperfections in analog components; a mistake results from incorrect programming, coding, data transcription, manual operation, etc; a malfunction results from a failure in the operation of a machine component such as a gate, flip-flop, or an amplifier. (C) 165-1977

(4) (automatic control) An indicated value minus an accepted standard value, or true value. *Note:* ASA C85 deprecates use of the term as the negative of deviation. *See also:* accuracy; precision. (PE/EDPG) [3]

(5) (unbalanced transmission-line impedance) "In any measurement of a particular quantity, the difference between the measurement concerned and the true value of the magnitude of this quantity, taken positive or negative accordingly as the measurement is greater or less than the true value"

(Churchill Eisenhart, "Realistic Evaluation of the Precision and Accuracy of Instrument Calibration Systems," Journal of Research of the National Bureau of Standards, Vol. 67C, No. 2, April-June 1963). (IM/HFIM) 314-1971w

(6) (measurement) The algebraic difference between a value that results from measurement and a corresponding true value. (PE/PSE) 94-1970w

(7) (pascal computer programming language) A violation by a program of the requirements of IEEE 770X3.97-1983 that a processor is permitted to leave undetected. *Notes:* 1. If it is possible to construct a program in which the violation or non-violation of this standard requires knowledge of the data read by the program or the implementation definition of implementation-defined features, then violation of that requirement is classified as an error. Processors may report on such violations of the requirement without such knowledge, but there always remain some cases that require execution or simulated execution, or proof procedures with the required knowledge. Requirements that can be verified without such knowledge are not classified as errors. 2. Processors should attempt the detection of as many errors as possible. Permission to omit detection is provided for implementations in which the detection would be an excessive burden. (Std100) 812-1984w

(8) (A) (software) The difference between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition. For example, a difference of 30 meters between a computed result and the correct result. *See also:* syntactic error; dynamic error; semantic error; transient error; indigenous error; static error; fatal error. **(B)** An incorrect step, process, or data definition. For example, an incorrect instruction in a computer program. **(C)** An incorrect result. For example, a computed result of 12 when the correct result is 10. **(D)** A human action that produces an incorrect result. For example, an incorrect action on the part of a programmer or operator. *Note:* While all four definitions are commonly used, one distinction assigns definition A to the word "error," definition B to the word "fault," definition C to the word "failure," and definition D to the word "mistake." (C/Std100) 610.12-1990

(9) (software reliability) Human action that results in software containing a fault. Examples include omission or misinterpretation of user requirements in a software specification, incorrect translation, or omission of a requirement in the design specification. (SE/C) 982.2-1988, 982.1-1988

(10) Manifestation of a failure in a system. (C/BA) 896.9-1994w, 896.3-1993w

(11) The difference between the measured value of a quantity and the true value of that quantity under specified conditions. (PE/PSIM) 4-1995

(12) The difference between a computed, observed, or measured value or condition and the true, specified, or theoretically correct value or condition. For example: A difference of 30 m between a computed result and the correct result. *See also:* parity error; frame check sequence error; burst error. (C) 610.7-1995

error analysis (A) (software) The process of investigating an observed software fault with the purpose of tracing the fault to its source. **(B) (software)** The process of investigating an observed software fault to identify such information as the cause of the fault, the phase of the development process during which the fault was introduced, methods by which the fault could have been prevented or detected earlier, and the method by which the fault was detected. (C) The process of investigating software errors, failures, and faults to determine quantitative rates and trends. *See also:* fault; failure. (C/SE) 729-1983

error and correction The difference between the indicated value and the true value of the quantity being measured. *Note:* It is the quantity that algebraically subtracted from the indicated value gives the true value. A positive error denotes theat the indicated value of the instrument is greater than the true value. The correction has the same numerical value as the error of the indicated value, but the opposite sign. It is the quantity that algebraically added to the indicated value gives the true value. If T, I, E, and C represent, respectively, the true value, the indicated value, the error, and the correction, the following equations hold: $E = I - T$; $C = T - I$ Example: a voltmeter reads 112 volts when the voltage applied to its terminals is actually 110 volts. *See also:* accuracy rating. (EEC/PE) [119]

error band (accelerometer) (gyros) A specified band about the specified output function that contains the output data. The error band contains the composite effects of nonlinearity, resolution, nonrepeatability, hysteresis, and other uncertainties in the output data. (AES/GYAC) 528-1994

error, bit *See:* bit error.

error bit A bit in a status register of an S-module that is associated with detection of some error detected by that S-module. Such bits may be found in the Bus Error register, the optional Module Status register, or in an Additional Status register. Error bits of the Bus Error register affect the value of the BSE bit of the Slave Status register. Error bits of the optional Module Status register or of an Additional Status register are permitted to affect the value of either the BSE bit or EVO bit of the Slave Status register. (TT/C) 1149.5-1995

error burst (1) (data transmission) A group of bits in which two successive erroneous bits are always separated by less than a given number x of correct bits. The last erroneous bit in the burst and the first erroneous bit in the following burst are accordingly separated by x correct bits or more. Number x should be specified when describing an error burst. (PE) 599-1985w

(2) (mathematics of computing) A group of bits in which two erroneous bits are separated by fewer than a specified number of correct bits. (C) 1084-1986w

error category (software) One of a set of classes into which an error, fault, or failure might fall. Categories may be defined for the cause, criticality, effect, life cycle phase when introduced or detected, or other characteristics of the error, fault, or failure. *See also:* failure; fault; software; criticality. (C/SE) 729-1983s

error character A control character used to indicate that an error exists in the data or has occurred during transmission. (C) 610.5-1990w

error code of a task An attribute of a task that ordinarily specifies information about the most recent error that caused `POSIX_Error` to be raised. (C) 1003.5-1999

error coefficient (control system feedback) The real number C_n by which the n th derivative of the reference input signal is multiplied to give the resulting n th component of the actuating signal. *Note:* The error coefficients may be obtained by expanding in a Maclaurin series the error transfer function as follows:

$$\frac{1}{1 + GH(s)} = C_0 + C_1 s + C_2 s^2 + \ldots + C_n s^n$$

See also: feedback control system. (IM) [120]

error compensation Form of error processing when the erroneous state contains enough redundancy to enable correct service delivery. (C/BA) 896.9-1994w

error constant (control system feedback) The real number K_n by which the nth derivative of the reference input signal is divided to give the resulting nth component of the actuating signal. *Note:* $K_n = 1/C_n$; $K_0 = 1 + K_p$, where K_p is position constant; $K_1 = K_v$ velocity constant; $K_2 = K_a$ acceleration constant; $K_3 = K_j$ jerk constant. In some systems these constants may equal infinity. *See also:* feedback control system. (PE/EDPG) [3]

error control (1) Any of a variety of techniques employed to detect and/or correct transmission errors that occur on a communication channel. (SUB/PE) 999-1992w

(2) A technique used to detect the presence of errors and add refinements to correct the detected errors. *See also:* echo check. (C) 610.7-1995

error control character *See:* accuracy control character.

error-correcting code (1) A code in which each telegraph or data signal conforms to specific rules of construction so that departures from this construction in the received signals can be automatically detected, and permits the automatic correction, at the received terminal, or some or all of the errors. *Note:* Such codes require more signal elements than are necessary to convey the basic information. *See also:* error-detecting system; error-detecting code; error-detecting and feedback system. (COM) [49]

(2) (mathematics of computing) A code containing redundant information that can be used to detect certain classes of errors and to restore a word, byte, character, quantity, or message to its correct representation. *Synonym:* error-detecting and correcting code. (C) 610.7-1995, 1084-1986w

error-correction coding An encoding of data and redundant check bits that enables decoding hardware to reconstruct the original data in the presence of a data-bit or check-bit error. (C/MM) 1596.4-1996

error count The number of detected errors in the operation of some device. For communication channels, separate error counts may be maintained for several different error types, e.g., no response, invalid response, and multiple retries, to simplify determination of the error source(s). (SUB/PE) 999-1992w

error data (software) A term commonly (but not precisely) used to denote information describing software problems, faults, failures, and changes, their characteristics, and the conditions under which they are encountered or corrected. *See also:* fault; failure; software. (C/SE) 729-1983s

error-detecting and correcting code *See:* error-correcting code.

error-detecting and feedback system A system employing an error-detecting code and so arranged that a character or block detected as being in error automatically initiates a request for retransmission of the signal detected as being in error. (COM) [49]

error-detecting code (1) A code in which each expression conforms to specific rules of construction, so that if certain errors occur in an expression the resulting expression will not conform to the rules of construction and thus the presence of the errors is detected. *Note:* Such codes require more signal elements than are necessary to convey the fundamental information. *See also:* check; forbidden combination; error-correcting code. (C/COM) [85], [49]

(2) (mathematics of computing) A code containing redundant information that can be used to detect certain classes of errors in a word, byte, character, quantity, or message. *Synonym:* self-checking code. (C) 610.7-1995, 1084-1986w

error-detecting system (data transmission) A system employing an error-detecting code and so arranged that any signal detected as being in error is either deleted from the data delivered to the receiver, in some cases with an indication that such deletion has taken place, or delivered to the receiver together with an indication that it has been detected as being in error. (COM) [49]

error detection The action of identifying that a system state is erroneous. (C/BA) 896.9-1994w

error-detection coding An encoding of data and redundant check bits, such that in the presence of a data-bit or check-bit error decoding hardware can detect the error, but cannot reconstruct the original data. (C/MM) 1596.4-1996

error, dynamic *See:* dynamic error.

errored second A one-second interval during which one or more errors are received. (COM/TA) 1007-1991r

errored second, asynchronous *See:* asynchronous errored second.

errored second, severely *See:* severely errored second.

errored second, synchronous *See:* synchronous errored second.

error, fractional *See:* fractional error.

error-free second A one-second interval during which no error occurs. (COM/TA) 1007-1991r

error, linearity *See:* linearity error.

error log Memory space specifically allocated for recording errors. (C/BA) 896.3-1993w

error logging The recording of an error condition detected during the execution of a service. (SCC20) 1226-1998

error, logical *See:* logical error.

error, matching *See:* matching error.

error message metric The result of dividing the total number of error messages that have been formally demonstrated, by the total number of error messages. (C/SE) 730-1998

error model (A) (modeling and simulation) (software) A model used to estimate or predict the extent of deviation of the behavior of an actual system from the desired behavior of the system; for example, a model of a communications channel, used to estimate the number of transmission errors that can be expected in the channel. **(B) (modeling and simulation) (software)** In software evaluation, a model used to estimate or predict the number of remaining faults, required test time, and similar characteristics of a system. *Synonym:* error prediction model. (C) 610.3-1989, 610.12-1990

error prediction (software) A quantitative statement about the expected number or nature of faults in a system or component. *See also:* error model; error seeding. (C) 610.12-1990

error prediction model *See:* error model.

error, random *See:* random error.

error range The difference between the highest and lowest error values. (C) [85], [20]

error rate (1) (data transmission) Ratio of the number of characters of a message incorrectly received to the number of characters of the message received. (PE) 599-1985w

(2) The probability of an error occurring in the course of data manipulation. For serial binary channels, the error rate is usually expressed as the "bit error rate," i.e., the probability that an individual bit will be received in error. (SUB/PE) 999-1992w

(3) The ratio of the number of characters of a message incorrectly received to the total number of characters of the message received. (C) 610.7-1995

error recovery Form of error processing where an error-free state is substituted for an erroneous state. (C/BA) 896.9-1994w

error report A summary, either in full or in part, of the error log. (C/BA) 896.9-1994w, 896.3-1993w

error, resolution *See:* resolution error.

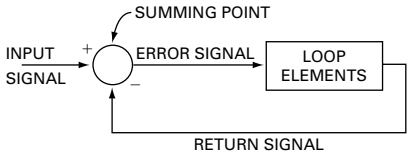
error seeding The process of intentionally adding known faults to those already in a computer program for the purpose of monitoring the rate of detection and removal, and estimating the number of faults remaining in the program. *Synonyms:* fault seeding; bug seeding. *See also:* indigenous error. (C) 610.12-1990

error signal (1) (excitation systems for synchronous machines) In a control system the error signal is the difference between a sensing signal and a constant reference signal. *Note:* In excitation control systems sensing signals may be proportional to synchronous machine terminal voltage, the ratio of terminal voltage to frequency, active or reactive armature current, active or reactive power, power factor, terminal frequency, shaft speed, generator field voltage or field current, and exciter field voltage or field current. (PE/EDPG) 421.1-1986r

(2) (automatic control device) A signal whose magnitude and sign are used to correct the alignment between the controlling and the controlled elements. (EEC/PE) [119]

(3) (power supplies) The difference between the output voltage and a fixed reference voltage compared in ratio by the two resistors at the null junction of the comparison bridge. The error signal is amplified to drive the pass elements and correct the output. (AES/PE) [41], [78]

(4) (control system feedback) (closed loop) The signal resulting from subtracting a particular return signal from its corresponding input signal. (See the corresponding figure.) *See also:* feedback control system.



block diagram of a closed loop

signal, error
(PE/EDPG) 421-1972s, [3]

error, static *See:* static error.

error strategy Methodology targeted at dealing with temporary errors. (C/BA) 896.3-1993w

error, systematic *See:* systematic error.

error tolerance The ability of a system or component to continue normal operation despite the presence of erroneous inputs. *See also:* fault tolerance; robustness.
(C) 610.12-1990

error transfer function (closed loop) (control system feedback) The transfer function obtained by taking the ratio of the Laplace transform of the error signal to the Laplace transform of its corresponding input signal. *See also:* feedback control system. (IM/PE/EDPG) [120], [3]

erythema (illuminating engineering) The temporary reddening of the skin produced by exposure to ultraviolet energy. *Note:* The degree of erythema is used as a guide to dosages applied in ultraviolet therapy. (EEC/IE) [126]

erythemal effectiveness (illuminating engineering) The capacity of various portions of the ultraviolet spectrum to produce erythema. (EEC/IE) [126]

erythemal efficiency of radiant flux (illuminating engineering) (for a particular wavelength) The ratio of the erythemal effectiveness of that wavelength to that of wavelength 296.7 nm (nanometers), which is rated as unity. *Note:* This term formerly was called "relative erythemal factor."
(EEC/IE) [126]

erythemal exposure (illuminating engineering) The product of erythemal flux density on a surface and time. It usually is measured in erythemal microwatt-minutes per square centimeter. *Note:* For average untanned skin a minimum perceptible erythema requires about 300 microwatt-minutes per square centimeter of radiation at 296.7 nm (nanometers).
(EEC/IE) [126]

erythemal flux (illuminating engineering) Radiant flux evaluated according to its capacity to produce erythema of the untanned human skin. It usually is measured in microwatts of ultraviolet radiation weighted in accordance with its erythemal efficiency. Such quantities of erythemal flux would be in erythemal microwatts. *Note:* A commonly used practical unit of erythemal flux is the erythemal unit (EU) or E-viton (erytheme) which is equal to the amount of radiant flux which will produce the same erythemal effect as 10 microwatts of radiant flux at wavelength 296.7 nm (nanometers).
(EEC/IE) [126]

erythemal flux density (illuminating engineering) The erythemal flux per unit area of the surface being irradiated. It is equal to the quotient of the incident erythemal flux divided by the area of the surface when the flux is uniformly distributed. It usually is measured in microwatts per square centimeter of erythemally weighed ultraviolet radiation (erythemal microwatts per square centimeter). *Note:* A suggested practical unit of erythemal flux density is the Finsen which is equal to one E-viton per square centimeter.
(EEC/IE) [126]

ESC *See:* escape character; escape key.

escalator A power-driven, inclined, continuous stairway used for raising or lowering passengers. *See also:* elevator.
(EEC/PE) [119]

escape character (ESC) (1) (computers) A character used to indicate that the succeeding one or more characters are expressed in a code different from the code currently in use.
(C) [85], [20]

(2) (modeling and simulation) A code extension character used, in some cases with one or more succeeding characters, to indicate by some convention or agreement that the coded representations following the character or the group of characters are to be interpreted according to a different code or according to a different coded character set.
(C) 610.5-1990w

escape key (ESC) (A) A special key on a keyboard that is used to represent the escape character. **(B)** A command key that is used to terminate a process or transfer from one mode of operation to another. *See also:* attention key.
(C) 610.10-1994

escapement The relative movement by one increment between the printing medium and the printing position.
(C) 610.10-1994w

escape ratio (charge-storage tubes) The average number of secondary and reflected primary electrons leaving the vicinity of a storage element per primary electron entering that vicinity. *Note:* The escape ratio is less than the secondary-emission ratio when, for example, some secondary electrons are returned to the secondary-emitting surface by a retarding field. *See also:* charge-storage tube. (ED) 158-1962w

E-scope A cathode-ray oscilloscope arranged to present an E-display. (AES/RS) 686-1990

ESD *See:* end-of-stream delimiter; electrostatic discharge.

ESD current wave The waveform of the discharge current between an intruder and a receptor. (SPD/PE) C62.47-1992r

ESDD (equivalent salt-deposit density) A measure of contamination level. (T&D/PE) 957-1987s, 957-1995

ESD event (1) The occurrence of a single ESD.
(EMC) C63.16-1993

(2) An interval that includes the ESD current, electromagnetic fields, and corona effects before and during an ESD.
(SPD/PE) C62.47-1992r

ESD receptor The surface (or target) of the object at rest being subjected to the ESD event. (EMC) C63.16-1993

ESD response The EUT reaction to ESD.
(EMC) C63.16-1993

ESD simulator A testing device used to simulate a human or furniture ESD event. (EMC) C63.16-1993

ESD simulator ground The pulse-current return connection of the ESD simulator. (SPD/PE) C62.38-1994r

ESD test voltage The amplitude (usually expressed in kV) of the initial electrostatic voltage that exists prior to discharge.
(EMC) C63.16-1993

ESG *See:* electrically suspended gyro.

ESDI *See:* enhanced small device interface.

Es layer *See:* sporadic E layer.

ESM *See:* electronic-warfare support measures.

ESONE A multi-national committee representing European nuclear laboratories. It produced the initial CAMAC specification and collaborates with NIM in the maintenance and extension of CAMAC and in the development of FASTBUS.
(NID) 960-1993

ESP *See:* enhanced service provider; Econometric Software Package.

ESP cable *See:* electric submersible pump cable.

ESS *See:* electronic switching system.

essential electrical systems (health care facilities) Systems comprised of alternate sources of power, transfer switches, overcurrent protective devices, distribution cabinets, feeders, branch circuits, motor controls, and all connected electrical equipment, designed to provide designated areas with continuity of electrical service during disruption of normal power sources and also designed to minimize the interruptive effects of disruption within the internal wiring system.
(NESC/NEC) [86]

essential freeze protection The use of electric heat tracing systems to prevent the temperature of fluids from dropping below the freezing point of the fluid in desirably available or essential outdoor (usually) piping systems at fossil fueled generating stations. An example of an essential freeze protection system is the heat tracing for the feedwater system. (PE/EDPG) 622B-1988r

essential loads Those station auxiliary loads necessary to maintain full output of the station. (SUB/PE) 1158-1991r

essentially zero source impedance (electronic power transformer) Implies that the source impedance is low enough so that the test currents under consideration would cause less than five (5) percent distortion (instantaneous) in the voltage amplitude or waveshape at the load terminals. (PEL/ET) 295-1969r

essential performance requirements (nuclear power generating station) Requirements that must be met if a component, module, or channel is to carry out its part in the implementation of a protective function. (PE/NP) 379-1977s

essential process control (1) (electric pipe heating systems) The use of electric pipe heating systems to increase or maintain or both, the temperature of fluids (or processes) in desirably available or essential mechanical piping systems including pipes, pumps, valves, tanks, instrumentation, etc., in fossil-fueled generating stations. An example of an essential process control system is the heating for the fuel oil system. (PE/EDPG) 622A-1984r

(2) (electric heat tracing systems) The use of electric heat tracing systems to increase, maintain, or both, the temperature of fluids (or processes) in desirably available or essential mechanical piping systems including pipes, pumps, valves, tanks, instrumentation, etc, in fossil-fueled generation stations. An example of an essential process control system is the heating for the fuel oil system. (PE/EDPG) 622B-1988r

Estelle A specification language for telecommunications and distributed systems based on extended state transitions. (C) 610.13-1993w

estimated entry search *See:* interpolation search.

estimated life (thermal classification of electric equipment and electrical insulation) (performance) The expected useful service life based upon service experience or the results of tests performed in accordance with appropriate evaluation procedures established by the responsible technical committee, or both. (EI) 1-1986r

estimated maximum load The calculated maximum heat transfer that a heating or cooling system will be called upon to provide. (IA/PSE) 241-1990r

estimated position (navigation aid terms) The most probable position of a craft determined from incomplete data or data of questionable accuracy. (AES/GCS) 172-1983w

ETB character *See:* end of transmission block character.

ETC *See:* Extendible Compiler.

etched circuit *See:* printed circuit.

Ethernet LAN A CSMA/CD LAN that does *not* use LLC headers on its frames but instead encodes a protocol type field directly after the source address. (LM/C) 802.1H-1995

Ethernet Type-encoding The use of the Type interpretation of an IEEE 802.3 Length/Type field value in a frame as a protocol identifier associated with the MAC Service user data carried in the frame. *Note:* Ethernet Type-encoding can be used with MAC Service user data carried on non-IEEE 802.3 MACs by means of the SNAP-based encapsulation techniques specified in ISO/IEC 11802-5, IETF RFC 1042, and IETF RFC 1390. (C/LM) 802.1Q-1998

EU *See:* erythemal flux.

EULER An experimental programming language that is a generalization of the formal definition of ALGOL. (C) 610.13-1993w

Euler angles A set of three angles used to describe the orientation of an entity as a set of three successive rotations about three different orthogonal axes (*x, y,* and *z*). The order of rotation is first about *z* by angle psi (ψ), then about the new *y* by angle theta (θ), then about the newest *x* by angle phi (ϕ). Angles ψ and ϕ range between $\pm\pi$, while angle θ ranges only between $\pm\pi/2$ radians. These angles specify the successive rotations needed to transform from the world coordinate system to the entity coordinate system. The positive direction of rotation about an axis is defined by the right-hand rule. (DIS/C) 1278.1-1995

E-unit *See:* execution unit.

EUT *See:* equipment under test.

evacuating equipment The assembly of vacuum pumps, instruments, and other parts for maintaining and indicating the vacuum. *See also:* rectification. (EEC/PE) [119]

evaluation (1) Interpretation of measurements and observations, including determination of compliance with applicable specification. (NI) N42.17B-1989r

(2) Determination of fitness for use. (C/SE) 1074-1995s

(3) The process of determining whether an item or activity meets specified criteria. (C/SE) J-STD-016-1995

evaluation stack In a stack-based processor, a memory structure in which operands are stored before and after computations. (C) 610.10-1994w

evaluators Those who execute the evaluation portion of the process described in this recommended practice. They may also act in other roles (for example, selector). (C/SE) 1209-1992w

evanescent field (1) (fiber optics) A time varying electromagnetic field whose amplitude decreases monotonically, but without an accompanying phase shift, in a particular direction is said to be evanescent in that direction. (Std100) 812-1984w

(2) An electromagnetic field for which, as one moves away from a boundary, the phase is spatially invariant and the magnitude decays exponentially. *Notes:* 1. An evanescent field is a special case of an inhomogeneous plane wave. 2. Fields in a waveguide beyond cutoff are evanescent. (AP/PROP) 211-1997

evanescent mode (cutoff mode) (1) (waveguide) A field configuration in a waveguide such that the amplitude of the field diminishes along the waveguide, but the phase is unchanged. The frequency of this mode is less than the critical frequency. *See also:* waveguide. (AP/ANT) [35]

(2) *See also:* cutoff mode. (MTT) 146-1980w

evanescent waveguide *See:* cutoff waveguide.

EVE *See:* extreme value engineering.

even and odd mode characteristic impedances The characteristic impedances associated with the even and odd modes of a propagation of a symmetrical pair of coupled transmission lines with respect to ground. These impedances are a function of the degree of coupling between the lines. (MTT) 1004-1987w

even and odd modes The modes of propagation on a symmetrical planar transmission-line structure whose electric field distribution in the transverse cross section in even or odd with respect to reflections in the plane of symmetry of the structure. *Notes:* 1. A symmetrical coupled pair of transmission lines can support two fundamental modes—an even mode and an odd mode. 2. A single planar transmission line can support only one fundamental mode, which may be even or odd, depending on the structure of the transmission line. For example, the fundamental mode on a single microstrip line is an even mode. The first higher order mode is odd. On a single slot line, the fundamental mode is an odd mode. (MTT) 1004-1987w

even-odd check *See:* parity check.

even parity (1) An error detection method in which the number of ones in a binary word, byte, character, or message is maintained as an even number. (C) 1084-1986w

(2) The property possessed by a binary word, byte, character, or message that has an even number of ones. (C) 1084-1986w

event (1) (sequential events recording systems) A change in a process or a change in operation of equipment that is detected by bistable sensors. (PE/EDPG) [1]
(2) (A) (modeling and simulation) An occurrence that causes a change of state in a simulation. **(B) (modeling and simulation)** The instant in time at which a change in some variable occurs. (C/Std100) 610.3-1989
(3) A semantic construct associated with a point in time that may result in an instance of processing or state transitions on the part of the receiver. Events are usually carried between entities by DMA messages. For example, an inbound DMA event message may indicate an asynchronous error requiring Processor attention. (C/MM) 1212.1-1993
(4) An occurrence that may require reporting by the utilities defined in this standard. The reporting of an event may cause data to be written to stdout, stderr, or to a log file. (C/PA) 1387.2-1995
(5) A discrete change of state (status) of a system or device. (SWG/PE/SUB) C37.100-1992, C37.1-1987s
(6) (A) Any change in conditions or performance of interest. **(B)** An occurrence at a specific point in time. (PE/NP) 1082-1997
(7) Change of status or condition. (PE/NP) 692-1997
(8) An abstraction of the mechanism by which asynchronously generated signals or conditions are generated and represented. (IM/ST) 1451.1-1999

event-based planning An approach to establishing engineering plans, tasks, and milestones based upon satisfying significant accomplishments associated with key events rather than calendar-oriented milestones. (C/SE) 1220-1998

event data *See:* time-consistent traffic measures; traffic intensity.

event-driven simulation *See:* event-oriented simulation.

event, event command A command contained within an *event packet*. (C/MM) 1596.4-1996

event flag (1) A Boolean associated with a session and maintained by the service that is used to signal the arrival of objects in the delivery, retrieval, or input queue. (C/PA) 1224.1-1993w
(2) A single bit variable used to represent the occurrence of a particular event. (C/MM) 855-1990

Event Generator Publisher Port An instance of the class `IEEE1451_EventGeneratorPublisherPort` or of a subclass thereof. (IM/ST) 1451.1-1999

event horizon The earliest future date on which a system element will fail to perform date data processing consistently and predictably. (C/PA) 2000.1-1999

event management The mechanism that enables applications to register for and be made aware of external events such as data becoming available for reading. (C) 1003.5-1999

Event Occurrence EVO bit A bit in the Slave Status register of every S-module that is set by the S-module when a module-application-related condition requiring an interrupt has occurred. (TT/C) 1149.5-1995

event-oriented simulation A simulation in which attention is focused on the occurrence of events and the times at which those events occur; for example, a simulation of a digital circuit that focuses on the time of state transition. *Synonyms:* event-sequenced simulation; event-driven simulation. (C) 610.3-1989w

event packet A short, four-byte packet containing an event command that is directed to one slave or broadcast to all. Device state is affected by the event command, but no response is returned to the controller. (C/MM) 1596.4-1996

event recognition (sequential events recording systems) The capability to detect and process changes of state of one or more inputs. (PE/EDPG) [1]

event recorder (1) On-board device/system with crashworthy, nonvolatile memory, which records data to support accident/incident analysis. (VT) 1482.1-1999
(2) An on-board device/system with crashworthy memory that records data to support accident/incident analysis. (VT) 1475-1999

events Signals or interrupts generated by a device to notify another device of an asynchronous event. The contents of events are device dependent. (C/MM) 1155-1992

event-sequenced simulation *See:* event-oriented simulation.

event sequence sensor A sensor that detects a change of state in the physical world. The instant in time of the change of state, not the state value, is the "measurement." (IM/ST) 1451.2-1997

event tree A graphical representation of the logical progression of the possible scenarios through a multiple series of events that may or may not occur. (PE/NP) 1082-1997

everyday load (composite insulators) The bare conductor weight and wind load that predominates for the greatest period of time over the life of a line. (T&D/PE) 987-1985w

evh *See:* extra-high voltage.

E-viton *See:* erythemal flux.

evoked potential The electrical response of a neuron or neurons elicited by electrical or natural (i.e., auditory, visual, etc.) stimulus. To be contrasted with spontaneous activity, such as that recorded by the EEG. (T&D/PE) 539-1990

evolving fault A change in the current during interruption whereby the magnitude of current increases to a fault current or to a higher value of fault current in one or more phases. (SWG/PE) C37.100-1992

EV traffic measures *See:* extreme value traffic measures.

EW Acronym for early warning; electronic warfare. (AES) 686-1997

exact scheduling A scheduling algorithm used by the controller to predict the time delay needed by a slave to generate response packets. The controller reserves a time slot for the response, where the time slot is the exact size needed and is at the precise time for the expected response packet. (C/MM) 1596.4-1996

exalted carrier reception *See:* reconditioned carrier reception.

examination An inspection with the addition of partial dismantling, as required, supplemented by diagnostic tests in order to reliably evaluate the condition of the circuit breaker. (SWG/PE) C37.10-1995

exceedance level A statistical descriptor that is often used in expressing levels of quantities. For example, in acoustics, the L_{10} is the A-weighted sound level exceeded for 10% of the time over a specified time period (and for corona noise over a specified weather condition). For the other 90% of the time, the sound level is less than the L_{10}. Similarly, the L_{50} is the sound level exceeded 50% of the time; the L_{90} is the sound level exceeded 90% of the time, etc. The concept of exceedance levels can also be used as a statistical term for other corona effects such as radio noise, corona loss, and dc fields and ions. Any exceedance level canbe easily obtained from distributions that have been plotted on probability paper. (T&D/PE) 539-1990

exception (1) (software) An event that causes suspension of normal program execution. Types include addressing exception, data exception, operation exception, overflow exception, protection exception, underflow exception. (C) 610.12-1990
(2) (MULTIBUS) An abnormal condition on the bus caused by either a bus parity error, a bus time-out, a protocol violation, or a bus owner reply phase termination. (C/MM) 1296-1987s
®Multibus is a registered trademark of Intel Corporation.

exception condition (1) A condition assumed by a secondary or remote station when it receives a command that it cannot execute, or when it receives data it cannot process. (C) 610.7-1995
(2) The condition assumed by an LLC upon receipt of a command PDU that it cannot execute due to either a transmission error or an internal processing malfunction. (C/LM/CC) 8802-2-1998

exception operation (MULTIBUS) A bus operation in which an agent places an error indication on the parallel system bus. The error indication causes all bus agents to terminate arbitration and transfer operations. (C/MM) 1296-1987s

®Multibus is a registered trademark of Intel Corporation.

exception reporting An information processing technique that screens large amounts of computerized data and produces a report containing only the data that require action. *See also:* information overload. (C) 610.2-1987

Exception Window A time interval during which the impedance of a mated connector and associated transmission line is allowed to exceed the impedance tolerance specification for signals passed through that connector. (C/LM) 802.3-1998

except operation* *See:* exclusion.

* Deprecated.

excess gain The value of the positive gain (in decibels) at any specified frequency for the open oscillator loop measured under small signal conditions (no limiting action). The source and load impedance must be specified. (UFFC) 1037-1992w

excess-fifty code A binary code in which a decimal number n is represented by the binary equivalent of $n + 50$. *Synonym:* excess-fifty representation. (C) 1084-1986w

excess-fifty representation *See:* excess-fifty code.

excess insertion loss (fiber optics) In an optical waveguide coupler, the optical loss associated with that portion of the light which does not emerge from the nominally operational ports of the device. *See also:* optical waveguide coupler. (Std100) 812-1984w

excess-sixty-four code A binary code in which a decimal number n is represented by the binary equivalent of $n + 64$. *Synonym:* excess-sixty-four representation. (C) 1084-1986w

excess-sixty-four representation *See:* excess-sixty-four code.

excess-three BCD *See:* excess-three code.

excess-three code (A) A BCD code in which a decimal digit n is represented by the four-bit binary equivalent of $n + 3$.

Excess-Three Code

DECIMAL DIGIT:	0	1	2	3
EXCESS 3 CODE:	0011	0100	0101	0110

Synonyms: excess-three representation; excess-three BCD. **(B) (electronic computation)** Number code in which the decimal digit n is represented by the four-bit binary equivalent of $n + 3$. Specifically:

decimal digit	excess-three code
0	0011
1	0100
2	0101
3	0110
4	0111
5	1000
6	1001
7	1010
8	1011
9	1100

(C) 1084-1986, 162-1963

excess-three representation *See:* excess-three code.

excess meter An electricity meter that measures and registers the integral, with respect to time, of those portions of the active power in excess of the predetermined value. *See also:* electricity meter. (EEC/PE) [119]

excess reactivity (power operations) More reactivity than that needed to achieve criticality. In order to avoid frequent reactor shutdowns to replace fuel that has been consumed and to compensate for the accumulation of fission products that have high neutron absorption cross sections and negative temperature coefficients, excess reactivity is provided in a reactor by including additional fuel in the core at startup. *See also:* reactivity. (PE/PSE) 858-1987s

exchange *See:* private automatic exchange; private branch exchange; exchange service; private automatic branch exchange; central office; central office exchange.

exchangeable power (per unit bandwidth, at a port) The extreme value of the power flow per unit bandwidth from or to a port under arbitrary variations of its terminating impedance. *Notes:* 1. The exchangeable power pe at a port with a mean-square open-circuit voltage spectral density e^2 and an internal impedance with a real part R is given by the relation

$$p_e = \frac{\overline{e^2}}{4R}$$

2. The exchangeable power is equal to the available power when the internal impedance of the port has a positive real part. *See also:* waveguide; signal-to-noise ratio. (ED) [45]

exchangeable power gain (two-port linear transducer) At a pair of selected input and output frequencies, the ratio of the exchangeable signal power of the output port of the transducer to the exchangeable signal power of the source connected to the input port. *Note:* The exchangeable power gain is equal to the available power gain when the internal impedances of the source and the output port of the transducer have positive real parts. *See also:* signal-to-noise ratio; waveguide. (ED) [45]

exchange area (1) (telephone switching systems) The territory included within the boundaries of a telecommunications exchange. (COM) 312-1977w

(2) In North America, an area within which there is a single uniform set of charges for telephone service. An exchange area may be served by a number of end offices. *Note:* In Europe, the area of service of a single end office is an exchange area. A call between any two points within an exchange area is a local call. (C) 610.7-1995

Exchange Carriers' Standards Association The Secretariat for ASC T1, which develops the ASC T1's series of standards on telecommunication. (C) 610.7-1995, 610.10-1994w

exchange, central office *See:* central office exchange.

exchange data Data that is received or transmitted via data exchange in an appropriate format. *See also:* data exchange. (C) 610.5-1990w

eXchange IDentification (XID) A frame exchange used during the logical connection (initialization) sequence for the purpose of transferring Data Link layer and upper layer parameters between the primary station (BCC) and the secondary station (DCC). (EMB/MIB) 1073.3.1-1994

exchange layer The exchange layer describes the procedure of the node-to-node exchange of characters to ensure the proper functioning of the link. The exchange layer provides the service to the higher layers of the transmission of an indefinite sequence of N_chars. (C/BA) 1355-1995

exchange selection sort *See:* bubble sort.

exchange service (1) (data transmission) A service permitting interconnection of any two customers' telephones through the use of a switching equipment. (PE) 599-1985w

(2) In data communications, a service that permits interconnection of any two customers' stations through the use of the exchange system. (C) 610.7-1995

exchange sort A sort in which pairs of items in a set are examined in some sequence, pairs found out of order are exchanged, and the process is repeated until all items are in the correct order. Multiple passes are usually required. *See also:* bubble sort; radix exchange sort; cocktail shaker sort; Batcher's parallel sort. (C) 610.5-1990w

exchange system In data communications, a system that controls the connection of incoming and outgoing lines. (C) 610.7-1995

excitability (1) (irritability) (electrobiology) The inherent ability of a tissue to start its specific reaction in response to an electric current. (EMB) [47]

(2) (overhead power lines) The sensitivity of an excitable membrane to a stimulus. (T&D/PE) 539-1990

excitability curve (medical electronics) A graph of the excitability of a given tissue as a function of time, where excitability is expressed either as the reciprocal of the intensity of an electric current just sufficient at a given instant to start the

specific reaction of the tissue, or as the quotient of the initial (or conditioning) threshold intensity for the tissue by subsequent threshold intensities. (EMB) [47]

excitable membrane The membrane of nerve or muscle cells having an electrochemical property that results in sudden, major changes in ionic permeability when excited by an appropriate stimulus. (T&D/PE) 539-1990

excitation (1) (control of small hydroelectric plants) A source of direct current for the synchronous generator field. (PE/EDPG) 1020-1988r

(2) (array antenna) For an array of radiating elements, the specification, in amplitude and phase, of either the voltage applied to each element or the input current to each element. (AP/ANT) 145-1993

excitation anode (pool-cathode rectifier tube) An electrode that is used to maintain an auxiliary arc in the vacuum tank. *See also:* electrode; rectification. (EEC/PE) [119]

excitation coefficients The relative values, in amplitude and phase, of the excitation currents or voltages of the radiating elements of an array antenna. *Synonym:* feeding coefficients. (AP/ANT) 145-1993

excitation control system A feedback control system that includes the synchronous machine and its excitation system. (PE/EDPG) 421.4-1990, 421-1972s

excitation control system stabilizer (synchronous machines) An element or group of elements that modify the forward signal by either series or feedback compensation to improve the dynamic performance of the excitation control system. (PE/EDPG) 421-1972s

excitation current (1) (no-load current) (power and distribution transformers) The current that flows in any winding used to excite the transformer when all other windings are open-circuited. It is usually expressed in percent of the rated current of the winding in which it is measured. (PE/TR) C57.12.80-1978r

(2) (voltage regulators) The current that maintains the excitation of the regulator. *Note:* It is usually expressed in per unit or in percent of the rated series-winding current of the regulator. *See also:* voltage regulator; efficiency. (PE/TR) C57.15-1968s

(3) The current supplied to unloaded transformers or similar equipment. (SWG/PE) C37.100-1992

(4) The current that maintains the excitation of the regulator. It may be expressed in amperes, per unit, or percent of the rated current of the regulator. (PE/TR) C57.15-1999

excitation current interrupting rating (of an interrupter switch) The highest rms current in amperes between zero and 0.1 power factor lagging that a device is required to interrupt, without requiring maintenance, at its rated maximum voltage and at rated frequency, for a number of operations equal to the life expectancy of the switch. (SWG/PE) C37.30-1992s

excitation current switching capability (of a generator circuit breaker) The highest magnetizing current that a generator circuit breaker shall be required to switch at any voltage up to rated maximum voltage at power frequency without causing an overvoltage exceeding the levels agreed upon between the user and the manufacturer. (SWG/PE) C37.013-1997

excitation equipment (rectifier) The equipment for starting, maintaining, and controlling the arc. *See also:* rectification. (PE/EEC) [119]

excitation losses *See:* no-load losses **(series transformer)** The losses in the transformer with the secondary winding open-circuited when the primary winding is excited at rated frequency and at a voltage that corresponds to the primary voltage obtained when the transformer is operating at nominal rated load. *Note:* The measurement should be made with a constant voltage source of supply with not more than 3-percent harmonic deviation from sine wave. (EEC/LB) [98]

(2) (instrument transformers) The watts required to supply the energy necessary to excite the transformer which include the dielectric watts, the core watts, and the watts in the excited winding due to the excitation current. (PE/TR) C57.12.80-1978r, C57.13-1978s

excitation losses for an instrument transformer The power (usually expressed in watts) required to excite the transformer at its primary terminals. *Note:* Excitation losses include core, dielectric, and winding losses due to the excitation current. (PE/TR) C57.13-1993

excitation power current transformer (excitation systems for synchronous machines) The elements in a compound source-rectifier excitation system which transfer electrical energy from the synchronous machine armature current to the excitation system at a magnitude and phase relationship required by the excitation system. (PE/EDPG) 421.1-1986r

excitation power potential transformer (excitation systems for synchronous machines) The element or elements in a compound source-rectifier excitation system which transfer electrical energy from the synchronous machine armature terminals to the excitation system at a magnitude and phase relationship required in the excitation system. Also, the element or elements in a potential source-rectifier excitation system which transfer electrical energy either from the machine terminals or from an auxiliary bus to the excitation system at a magnitude level required by the excitation system. (PE/EDPG) 421.1-1986r

excitation purity (1) (light) (television) The ratio of the distance from the reference point to the point representing the sample to the distance along the same straight line from the reference point to the spectrum locus or to the purple boundary, both distances being measured (in the same direction from the reference point) on the CIE chromaticity diagram. *Note:* When giving excitation purity and dominant (or complimentary) wavelength as a pair of values to determine the chromaticity coordinates, the reference point must be the same in all cases, and it must represent the reference standard light (specified achromatic light) mentioned in the definitions of dominant wavelength. (BT/AV) 201-1979w

(2) (illuminating engineering) (of a light) The ratio of the distance on the CIE chromaticity diagram between the reference point and the light point to the distance in the same direction between the reference point and the spectrum locus or the purple boundary. (EEC/IE) [126]

excitation-regulating winding (power and distribution transformers) (two-core regulating transformer) In some designs, the main unit will have one winding operating as an autotransformer which performs both functions listed under excitation and regulating windings. Such a winding is called the "excitation-regulating winding." (PE/TR) C57.12.80-1978r

excitation response *See:* exciter voltage response.

excitation system (1) (excitation systems for synchronous machines) The equipment providing field current for a synchronous machine, including all power, regulating, control, and protective elements. (PE/EDPG) 421.4-1990, 421.1-1986r

(2) (rotating machinery) The source of field current for the excitation of a principal electric machine, including means for its control. *See also:* direct-current commutating machine. (PE) [9]

excitation system ceiling voltage (excitation systems) The maximum dc component of system output voltage that may be attained by an excitation system under specified conditions. *Note:* In some excitation systems, ceiling voltage may have both positive and negative values. Also, in some special applications, the excitation system is capable of supplying both positive and negative field current to the synchronous machine. (PE/EDPG) 421A-1978s

excitation system duty cycle (excitation systems for synchronous machines) An initial operating condition and a subsequent sequence of events of specified duration to which the excitation system will be exposed. *Note:* The duty cycle usually involves a three-phase fault of specified duration which is located electrically close to the synchronous machine. Its

primary purpose is to specify the duty that the excitation system components can withstand without incurring maloperation or damage. (PE/EDPG) 421.1-1986r

excitation system, high initial response An excitation system having an excitation system voltage response time of 0.1 second or less. (PE/EDPG) 421-1972s

excitation system nominal ceiling voltage (excitation systems) The ceiling voltage attained by an excitation system under the following conditions: (A) The exciter loaded with a resistor having an ohmic value equal to the resistance of the filed winding to be excited and with this field winding at a temperature of 75°C for field windings designed to operate at rating with a temperature rise of 60°C or less; or 100°C for field windings designed to operate at rating with a temperature rise greater than 60°C. For rectifier exciters nominal ceiling voltage should be determined with the exciter loaded with a load having resistance as specified above and sufficient inductance so that regulation effects and voltage and current waveforms can be properly duplicated. For test purposes, providing such a load may often be impractical. In such cases, analytical means may be used to predict performance under actual loading and conditions. (B) For excitation systems employing a rotating exciter, the ceiling should be determined at rated speed. (C) For potential-source rectifier excitation systems, the ceiling should be determined with rated (100 percent) potential applied unless otherwise specified. (D) In compound-rectifier excitation systems both generator voltage and current inputs are utilized as the source of power for the excitation system. The nominal ceiling voltage will be determined under specified reduced generator terminal voltage and increased generator terminal current conditions as would be encountered during power system faults and other disturbances. For some applications where relay coordination is a consideration, the ceiling voltage will be determined by a requirement that the generator produce a specific value of steady-state three-phase short circuit current. (PE/EDPG) 421A-1978s

excitation system nominal response (excitation systems for synchronous machines) The rate of increase of the excitation system output voltage determined from the excitation system voltage response curve, divided by the rated field voltage. This rate, if maintained constant, would develop the same voltage-time area as obtained from the actual curve over the first half-second interval (unless a different time interval is specified). (PE/EDPG) 421.1-1986r

excitation system output terminals (excitation systems for synchronous machines) The place of output from the equipmant comprising the excitation system. These terminals may be identical with the field winding terminals. (PE/EDPG) 421.1-1986r

excitation system rated current (excitation systems for synchronous machines) The direct current at the excitation system output terminals which the excitation system can supply under defined conditions of its operation. This current is at least that value required by the synchronous machine under the most demanding continuous operating conditions (generally resulting from synchronous machine voltage frequency variations and power factor variations). (PE/EDPG) 421.1-1986r

excitation system rated voltage (excitation systems for synchronous machines) The direct voltage at the excitation system output terminals which the excitation system can provide when delivering excitation system rated current under rated continuous load conditions of the synchronous machine with its field winding at 75°C for field windings designed to operate at rating with a temperature rise of 60°C or less; or 100°C for field windings designed to operate at rating with a temperature rise greater than 60°C. (PE/EDPG) 421.1-1986r

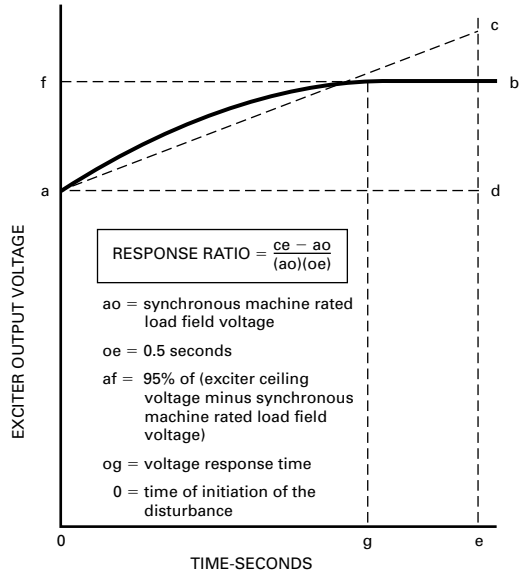
excitation-system stability (rotating machinery) (synchronous machines) The ability of the excitation system to control the field voltage of the principal electric machine so that transient changes in the regulated voltage are effectively suppressed and sustained oscillations in the regulated voltage are not produced by the excitation system during steady-load conditions or following a change to a new steady-load condition. *Note:* It should be recognized that under some system conditions it may be necessary to use power system stabilizing signals as additional inputs to excitation control systems to achieve stability of the power system including the excitation system. *See also:* direct-current commutating machine. (PE/EDPG) [9], 421-1972s

excitation system stabilizer (1) (excitation systems for synchronous machines) An element or group of elements that modify the forward signal by either series or feedback compensation to improve the dynamic performance of the excitation control system. (PE/EDPG) 421.1-1986r

(2) (excitation systems for synchronous machines) A control element that is used to stabilize the excitation control system. (PE/EDPG) 421.4-1990

excitation system voltage response (1) (excitation systems) The rate of increase or decrease of the excitation system output voltage determined from the excitation system voltage-time response curve, which rate if maintained constant, would develop the same voltage-time area as obtained from the curve for a specified period. The starting point for determining the rate of voltage change is the initial value of the excitation system voltage time response curve. Referring to the figure below, the excitation system voltage response is illustrated by line ac. This line is determined by establishing the area acd equal to area abd. *Notes:* 1. The starting point for determining the rate of voltage change is the initiation of the disturbance, that is, the excitation system voltage time response should include any delay time that may be present. 2. A system having an excitation system voltage response time of 0.1 s or less is defined as a high response excitation system. (PE/EDPG) 421A-1978s

(2) (synchronous machines) The rate of increase or decrease of the excitation system output voltage determined from the excitation system voltage-time response curve, that if maintained constant would develop the same voltage-time area as obtained from the curve for a specified period. The starting point for determining the rate of voltage change is the initial value of the excitation system voltage-time response curve. *Notes:* 1. Similar definitions can be applied to the excitation system major components such as the exciter and regulator. 2. A system having an excitation system voltage response time of 0.1 second or less is defined as a "high initial response excitation system."



excitation system voltage response

(PE/EDPG) 421-1972s

excitation system voltage response ratio (1) (excitation systems) The numerical value that is obtained when the excitation system voltage response, in volts per second measured over the first 1/2 S interval, unless otherwise specified, is divided by the rated load field voltage of the synchronous machine. *Notes:* 1. Referring to the figure to the definition of **excitation system voltage response,** the excitation system response ratio, unless otherwise specified, applies apply only to the increase in excitation system voltage. 2. Response ratio is determined with the exciter voltage initially equal to the rated load field voltage of the synchronous machine to which the exciter is applied, and then suddenly establishing circuit conditions required to obtain nominal exciter ceiling voltage. Excitation system response ratio is determined by suddenly reducing the voltage sensed by the synchronous machine voltage regulator from 100 percent to 80 percent unless otherwise specified. 3. Unless otherwise specified, excitation system response ratio should be determined with the exciter loaded as specified in 3.2.2. If, for practical considerations, the test is performed at no load, analytical means may be utilized to predict the performance under load. 4. For excitation systems employing a rotating exciter, the response ratio should be determined at rated speed. 5. For potential-source rectifier excitation systems, the nature of a power system disturbance greatly affects the available power supply voltages. The ceiling voltage available and the voltage respose time are more meaningful parameters. To specify a response ratio implies equivalence with other systems whose output is not adversely affected by such depressed voltage conditions. Therefore, response ratio is not recommended as a specification parameter for these excitation systems. 6. For compound-rectifier excitation systems, the nature of the power system disturbance and the specific design prameters of the exciter and the synchronous generator influence the performance of the exciter output voltage. For equivalence with rotating exciters, the response ratio should be based on performance under specified reduced generator terminal voltage and increased generator stator current conditions as would be encountered during power system faults and disturbances.
(PE/EDPG) 421A-1978s

(2) (synchronous machines) The numerical value that is obtained when the excitation system voltage response, in volts per second, measured over the first half-second interval, unless otherwise specified, is divided by the rated-load field voltage of the synchronous machine. *Note:* Unless otherwise specified, the excitation system voltage response ratio shall apply only to the increase in excitation system voltage.
(PE/EDPG) 421-1972s

excitation system voltage response time (excitation systems) The time in seconds for the excitation voltage to attain 95% of the difference between ceiling voltage and rated field voltage under specified conditions.
(PE/EDPG) 421.2-1990, 421.1-1986r

excitation system voltage time response (excitation systems for synchronous machines) The excitation system output voltage expressed as a function of time, under specified conditions. *Note:* A similar definition can be applied to the excitation system major components, the exciter and regulator, separately. (PE/EDPG) 421.2-1990, 421.1-1986r

excitation voltage The nominal voltage of the excitation circuit.
(R) [29]

excitation winding (power and distribution transformers) (two-core regulating transformer) The winding of the main unit, which draws power from the system to operate the two-core transformer. *See also:* field winding.
(PE/TR) C57.12.80-1978r

excite (rotating machinery) To initiate or develop a magnetic field in (such as in an electric machine). *See also:* asynchronous machine. (PE) [9]

excited-field loudspeaker A loudspeaker in which the steady magnetic field is produced by an electromagnet.
(EEC/PE) [119]

excited-state maser (laser maser) A maser in which the terminal level of the amplifying transition is not appreciably populated at thermal equilibrium for the ambient temperature.
(LEO) 586-1980w

excited winding (power and distribution transformers) (two-core regulating transformer) The winding of the series unit which is excited from the regulating winding of the main unit.
(PE/TR) C57.12.80-1978r

exciter (1) (excitation systems for synchronous machines) The equipment providing the field current for the excitation of a synchronous machine. (PE/EDPG) 421.1-1986r

(2) (excitation systems) The equipment that provides the field current for the excitation of a synchronous machine.
(PE/EDPG) 421.4-1990

(3) (rotating machinery) The source of all or part of the field current for the excitation of an electric machine. *Note:* Familar sources include direct-current commutator machines; alternating-current generators whose output is rectified; and batteries. *See also:* direct-current commutating machine; synchronous machine. (PE/IA/MT) [9], 45-1998

(4) (data transmission) In antenna practice, the portion of a transmitting array, (of the type which includes a reflector or director), which is directly connected with the source of power. (COM/PE) 599-1985w

exciter, alternator-rectifier *See:* alternator-rectifier exciter.

exciter-ceiling voltage (rotating machinery) (field discharge circuit breakers) The maximum voltage that may be attained by an exciter under specified conditions.
(SWG/PE) C37.100-1992, C37.18-1979r

exciter ceiling voltage, nominal (rotating machinery) The ceiling voltage of an exciter loaded with a resistor having an ohmic value equal to the resistance of the field winding to be excited and with this field winding at a temperature of: (1) 75 degrees Celsius for field windings designed to operate at rating with temperature rise of 60 degrees Celsius or less. (2) 100 degrees Celsius for field windings designed to operate at rating with a temperature rise greater than 60 degrees Celsius.
(EEC/PE) [119]

exciter, compound-rectifier *See:* compound source-rectifier exciter.

exciter, direct current generator-commutator (synchronous machines) An exciter whose energy is derived from a direct current generator. *Notes:* 1. The exciter includes a direct current generator with its commutator and brushes. It is exclusive of input control elements. 2. The exciter may be driven by a motor, prime mover, or by the shaft of the synchronous machine. (PE/EDPG) 421-1972s

exciter dome (rotating machinery) Exciter housing for a vertical machine. (PE) [9]

exciter losses (synchronous machines) The total of the electric and mechanical losses in the equipment supply excitation.
(PE) [9], [84]

exciter, main *See:* main exciter.

exciter or direct-current generator relay (power system device function numbers) A relay that forces the dc machine field excitation to build up during starting or which functions when the machine voltage has built up to a given value.
(SUB/PE) C37.2-1979s

exciter, pilot *See:* pilot exciter.

exciter platform (rotating machinery) A deck on which to stand while inspecting the exciter. (PE) [9]

exciter, potential source-rectifier *See:* potential source-rectifier exciter.

exciter response *See:* exciter voltage response.

exciter response ratio, main (synchronous machines) The numerical value obtained when the response, in volts per second, is divided by the rated-load field voltage, which response, if maintained constant, would develop, in one half-second, the same excitation voltage-time area as attained by the actual exciter. *Note:* The response is determined with no load on the exciter voltage initially equal to the the rated-

load field voltage, and then suddenly establishing circuit conditions which would be used to obtain nominal exciter ceiling voltage. For a rotating exciter, response should be determined at rated speed. This definition does not apply to main exciters having one or more series field, except a light differential series field, or to electronic exciters. (PE/EDPG) 421-1972s

exciter voltage response The rate of increase or decrease of the exciter voltage when a change in this voltage is demanded. It is the rate determined from the exciter voltage response curve that if maintained constant would develop the same exciter voltage-time area as is obtained from the curve for a specified period. The starting point for determining the rate of voltage change shall be the initial value of the exciter voltage-time response curve. *See also:* asynchronous machine. (PE) [9]

exciting current The total current applied to a coil that links a ferromagnetic core. The component of the primary current of a transformer that is sufficient by itself to cause the counter electromotive force to be induced in the primary winding. (CHM) 270-1966w, [51]

exciting field The total field responsible for the waves scattered by a particle or elemental surface area. In the case of single scattering, the exciting field consists solely of the incident field. In the multiple scattering case, the exciting field consists of the incident field plus the fields scattered by and among all other particles or elemental surface areas. *See also:* incident field. (AP/PROP) 211-1997

excitron A single-anode pool tube provided with means for maintaining a continuous cathode spot. (ED) [45]

exclusion (1) (mathematics of computing) A dyadic Boolean operator having the property that if P is a statement and Q is a statement, then the expression P exclusion Q is true if and only if P is true and Q is false. *Note:* P exclusion Q is often represented by a combination of AND and NOT symbols such as P$\Lambda\sim$Q.

Exclusion Truth Table

P	Q	P$\Lambda\sim$Q
0	0	0
0	1	0
1	0	1
1	1	0

Synonym: NOT-IF-THEN. (C) 1084-1986w

(2) The dyadic Boolean operation whose result has the Boolean value 1 if and only if the first operand has the Boolean value 1 and the second has the Boolean value 0. *See also:* NOT-IF-THEN gate. (C) 610.10-1994w

exclusive lock A lock that grants the holder sole access to the locked data. No other process can access the data for either read or write purposes. *Contrast:* shared lock. (C) 610.5-1990w

exclusive modified An attribute assigned to a cache line if there is an up-to-date copy of the line in the module's cache and the module has the only valid copy in the system. (C/BA) 896.4-1993w

exclusive NOR (XNOR) *See:* equivalence.

exclusive-NOR element *See:* exclusive-NOR gate.

exclusive-NOR gate A gate that performs the Boolean operation of equivalence. *Synonyms:* exclusive-NOR element; IF-AND-ONLY-IF element. (C) 610.10-1994w

exclusive OR (XOR) (mathematics of computing) A dyadic Boolean operator having the property that if P is a statement and Q is a statement, then P exclusive-OR Q is true if and only if either, but not both, is true. *Note:* P exclusive OR Q is often represented by P$\oplus$Q or P$\cup$Q.

Exclusive OR Truth Table

P	Q	P$\oplus$Q
0	0	0
0	1	1
1	0	1
1	1	0

Synonyms: modulo-two sum; nonequivalence; inequivalence. *Contrast:* OR. (C) 1084-1986w

exclusive-OR element *See:* exclusive-OR gate.

exclusive-OR gate A gate that performs the Boolean operation of nonequivalence. *Synonym:* exclusive-OR element. (C) 610.10-1994w

exclusive unmodified An attribute assigned to a cache line if there is an up-to-date copy of the line in the module's cache and the module is to assume that no other copies of the line are valid in any other cache in the system. (C/BA) 896.4-1993w

excursion *See:* reference excursion.

EXEC A command language used in IBM's VM/CMS environment to carry out command level processing. *Note:* EXEC was superseded by EXEC2 and is superseded by REXX. (C) 610.13-1993w

EXEC2 *See:* EXEC.

Exec family of operations The collection of operations that cause a new program to be executed, *i.e.*, the `Exec` and `Exec_Search` procedures in `POSIX_Unsafe_Process_Primitives` and the `Start_Process` and `Start_Process_-Search` procedures in `POSIX_Process_Primitives`. (C) 1003.5-1999

executable instruction (A) An instruction that is in the instruction set for a given computer and can be executed in its current form. **(B)** A word or words containing the complete machine code for a computer operation. (C) 610.10-1994

executable file A regular file acceptable as a new process image file by the equivalent of the POSIX.1 *exec* family of functions, and thus usable as one form of a utility. The standard utilities described as compilers can produce executable files, but other unspecified methods of producing executable files may also be provided. The internal format of an executable file is unspecified, but a conforming application shall not assume an executable file is a text file. (C/PA) 9945-2-1993

executable source statements Source statements that direct the actions of the computer at run time. (C/SE) 1045-1992

execute (1) To carry out an instruction, process, or computer program. (C) 610.12-1990

(2) To perform the actions described in 3.9.1.1. *See also:* invoke. (C/PA) 9945-2-1993

execute features The electrical and mechanical equipment and interconnections that perform a function, associated directly or indirectly with a safety function, upon receipt of a signal from the sense and command features. The scope of the execute features extends from the sense and command features output to and including the actuated equipment-to-process coupling. *Note:* In some instances, protective actions may be performed by execute features that respond directly to the process conditions (for example, check valves, self-actuating relief valves). (PE/NP) 603-1998

execution (software) The process of carrying out an instruction or the instructions of a computer program by a computer. *See also:* instruction; computer program. (C/SE) 729-1983s

execution efficiency The degree to which a system or component performs its designated functions with minimum consumption of time. *See also:* storage efficiency; execution time. (C) 610.12-1990

execution monitor *See:* monitor.

execution phase The operations a software administration utility performs that modify the target. (C/PA) 1387.2-1995

execution time (software) The amount of elapsed time or processor time used in executing a computer program. *Note:* Processor time is usually less than elapsed time because the processor may be idle (for example, awaiting needed computer resources) or employed on other tasks during the execution of a program. *Synonyms:* run time; running time. *See also:* overhead time. (C) 610.12-1990

execution time theory (software) A theory that uses cumulative execution time as the basis for estimating software reliability. *See also:* software reliability; execution time. (C/SE) 729-1983s

execution trace A record of the sequence of instructions executed during the execution of a computer program. Often takes the form of a list of code labels encountered as the program executes. *Synonym:* code trace. *See also:* subroutine trace; variable trace; retrospective trace; symbolic trace. (C) 610.12-1990

execution unit In a pipelined machine, the portion of the computer that actually performs the operation specified by an instruction. (C) 610.10-1994w

executive *See:* supervisory program.

executive information system *See:* management information system.

executive program *See:* supervisory program.

executive routine (computers) A routine that controls the execution of other routines. *See also:* supervisory routine. (MIL/C) [2], [20], [85]

executive state *See:* supervisor state.

exercise (1) (test, measurement, and diagnostic equipment) To operate an equipment in such a manner that it performs all its intended functions to allow observation, testing, measurement and diagnosis of its operational condition. (MIL) [2]

(2) (A) One or more sessions with a common objective and accreditation. **(B)** The total process of designing, assembling, testing, conducting, evaluation, and reporting on an activity. *See also:* simulation exercise. (DIS/C) 1278.3-1996

(3) *See also:* simulation exercise. (DIS/C) 1278.1-1995

exerciser (1) Physical activity generator designed to manifest defects as errors. (C/BA) 896.3-1993w

(2) A device used to operate the EUT. (EMC) C63.16-1993

exfoliation A thick layer-like growth of corrosion product. (IA) [59]

existence constraint A kind of constraint stating that an instance of one entity cannot exist unless an instance of another related entity also exists. (C/SE) 1320.2-1998

existence dependency A kind of constraint between two related entities indicating that no instance of one can exist without being related to an instance of the other. The following association types represent existence dependencies: identifying relationships, categorization structures and mandatory nonidentifying relationships. (C/SE) 1320.2-1998

existing installation (elevators) An installation, prior to the effective date of a code: A) all work of installation was completed, or B) the plans and specifications were filed with the enforcing authority and work begun not later than three months after the approval of such plans and specifications. *See also:* elevator. (EEC/PE) [119]

exit (software) A point in a software module at which execution of the module can terminate. *Contrast:* routine entry point. *See also:* return. (C) 610.12-1990

exit routine A routine that receives control when a specified event, such as an error, occurs. (C) 610.12-1990

exogenous variable A variable whose value is determined by conditions and events external to a given model. *Synonym:* external variable. *Contrast:* endogenous variable. (C) 610.3-1989w

exothermic Characterized by or formed with the release of heat. (DEI) 1221-1993w

expand In the shell command language, when not qualified, the act of applying all the expansions described in 3.6. (C/PA) 9945-2-1993

expandability (1) (supervisory control, data acquisition, and automatic control) The capability of a system to be increased in capacity or provided with additional functions. (SWG/PE/SUB) C37.100-1992, C37.1-1994

(2) *See also:* extendability. (C) 610.12-1990

expanded sweep A sweep of the electron beam of a cathode-ray tube in which the movement of the beam is speeded up during a part of the sweep. *See also:* magnified sweep; radar. (EEC/PE) [119]

expander (data transmission) A transducer which, for a given amplitude range of input voltages, produces a larger range of output voltages. One important type of expander employs the envelope of speech signals to expand their volume range. (PE) 599-1985w

expandor (telephone switching systems) A switching entity for connecting a number of inlets to a greater number of outlets. (COM) 312-1977w

expansion (1) (modulation systems) A process in which the effective gain applied to a signal is varied as a function of the signal magnitude, the effective gain being greater for large than for small signals. (PE) [4]

(2) (oscillograph) A decrease in the deflection factor, usually as the limits of the quality area are exceeded. (Std100) [123]

(3) (data transmission) A process in which the effective gain applied to a signal is varied as a function of the signal magnitude, the effective gain being greater for large than for small signals; (in a switching stage), a switching stage in which the number of inputs is smaller than the number of outputs. (PE) 599-1985w

expansion board A circuit board that can be installed in an expansion slot in a computer; often used to increase the memory capabilities of the computing system. *Synonym:* add-on board. (C) 610.10-1994w

expansion chamber (for an oil cutout) A sealed chamber separately attachable to the vent opening to provide additional air space into which the gases developed during circuit interruption can expand and cool. (SWG/PE) C37.100-1992, C37.40-1993

expansion element *See:* module retainer.

expansion orbit (electronic device) The last part of the electron path that terminates at the target. It is outside the equilibrium orbit. *See also:* electron device. (ED) [45]

expansion slot An area within a computer that is reserved for an expansion board. (C) 610.10-1994w

expansion tank system *See:* conservator system.

expected data (test pattern language) The binary data that is expected to be read out of a memory array. It is identified by the symbol "Q." (TT/C) 660-1986w

expected failure duration The expected or long-term average duration of a single failure event. (IA/PSE) 493-1997

expected interruption duration The expected, or average, duration of a single-load interruption event. (IA/PSE) 493-1997, 399-1997

expedited traffic Traffic that requires preferential treatment as a consequence of jitter, latency, or throughput constraints, or as a consequence of management policy. (C/LM) 802.1D-1998

expendable cap (of an expendable-cap cutout) A replacement part or assembly for clamping the button head of a fuse link and closing one end of the fuseholder. It includes a pressure-responsive section that opens to relieve the pressure within the fuseholder, when a predetermined value is exceeded during circuit interruption. (SWG/PE) C37.100-1992, C37.40-1981s

expendable-cap cutout An open cutout having a fuse support designed for, and equipped with, a fuseholder having an expendable cap. (SWG/PE) C37.40-1993, C37.100-1992

experience Successful operation for a long time under actual operating conditions of machines designed with temperature rise at or near the temperature rating limit. (IA/PC) 1068-1996

experience or accepted test (insulation systems of synchronous machines) In accordance with IEEE Std 1-1969: "Experience," as used in ANSI C50.10-1977, means successful operation for a long time under actual operating conditions of machines designed with temperatures at or near the temperature limits. "Accepted test" as used in this standard means a test on a system or model system that simulates the electrical, thermal, and mechanical stresses occurring in service. (REM) [115]

expert system A computer system designed to solve a specific problem or class of problems by processing information

specific to the problem domain. (Typically, information processed by an expert system corresponds to rules or procedures applied by human experts to solve similar problems.) (ATLAS) 1232-1995

explicit address *See:* absolute address.

exploder *See:* blasting unit.

explosion-proof apparatus (1) (explosionproof) (mine apparatus) Apparatus capable of withstanding explosion tests as established by the United State Bureau of Mines, namely, internal explosions of methane-air mixtures, with or without coal dust present, without ignition of surrounding explosive methane-air mixtures and without damage to the enclosure or discharge of flame. *See also:* distribution center; luminaire. (NESC/SWG/BT/PE/IA/AV/PC/APP) [34], [56], [11], [86], [82]

(2) Apparatus enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that may occur within it, and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within. The apparatus operates at such an external temperature that a surrounding flammable atmosphere will not be ignited. (SWG/PE/NESC) C37.100-1992, C2-1984s

explosion-proof enclosure An enclosure designed and constructed to withstand an explosion of a specified flammable gas or vapor that may occur within it, and to prevent the ignition of flammable gas or vapor in the atmosphere surrounding the enclosure by sparks, flashes, or explosions of the specified gas or vapor that may occur within the enclosure. *Note:* Explosionproof apparatus should bear a nationally recognized independent testing laboratory approval rating of the proper class and group consonant with the spaces in which flammable volatile liquids, flammable gases, mixtures, or highly flammable substances may be present. (IA/MT) 45-1998

explosion-proof fuse A fuse, so constructed or protected, that for all current interruptions within its rating shall not be damaged nor transmit flame to the outside of the fuse. (SWG/PE) C37.40-1993, C37.100-1992

explosion-proof luminaire (illuminating engineering) A luminaire which is completely enclosed and capable of withstanding an explosion of a specific gas or vapor which may occur within it, and preventing the ignition of a specific gas or vapor surrounding the enclosure by sparks, flashes or explosion of the gas or vapor within. It must operate at such an external temperature that a surrounding flammable atmosphere will not be ignited thereby. (EEC/IE) [126]

explosion-tested equipment Equipment in which the housings for the electric parts are designed to withstand internal explosions of methane-air mixtures without causing ignition of such mixtures surrounding the housings. (EEC/PE) [119]

explosion-tested shuttle car A shuttle car equipped with explosion-tested equipment. (EEC/PE) [119]

explosives Mixtures of solids, liquids, or a combination of the two that, upon detonation, transform almost instantaneously into other products that are mostly gaseous and that occupy much greater volume than the original mixtures. This transformation generates heat, which rapidly expands the gases, causing them to exert enormous pressure. Dynamite and Primacord are explosives as manufactured. Aerex, Triex, and Quadrex are manufactured in two components and are not true explosives until mixed. Explosives are commonly used to build construction roads, blast holes for anchors, structure footings, etc. *Synonyms:* Quadrex; fertilizer; Primacord; powder; Aerex; dynamite; Triex. (T&D/PE) 524-1992r

exponent (1) (binary floating-point arithmetic) The component of a binary floating-point number that normally signifies the integer power to which two is raised in determining the value of the represented number. Occasionally the exponent is called the signed or unbiased exponent. (C/MM) 754-1985r

(2) (A) (mathematics of computing) A superscript indicating the number of times a number is to be used as a factor.

(B) (mathematics of computing) The component of a floating-point number that normally signifies the integer power to which the radix is raised in determining the value of the represented number. *Synonyms:* floating-point coefficient; characteristic; exrad. *Contrast:* significand. (C) 1084-1986

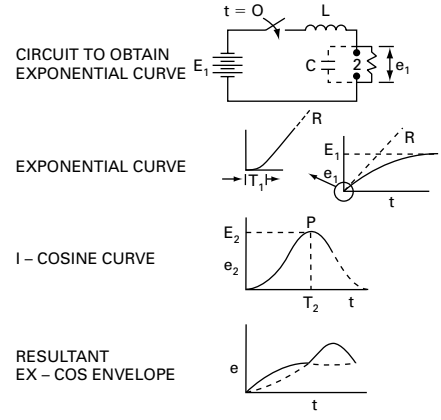
(3) (radix-independent floating-point arithmetic) The component of a floating-point number that normally signifies the integer power to which the radix is raised in determining the value of the represented number. Occasionally, the exponent is called the signed or unbiased exponent. (C/MM) 854-1987r

exponent arithmetic and logic unit A special-purpose arithmetic and logic unit for handling exponent calculations or floating-point operands. (C) 610.10-1994w

exponent character (A) A character within a picture specification that represents the beginning of the exponent within a floating point number. *Note:* K and E are commonly used. **(B)** A character within a picture specification that represents the scaling factor for a decimal number. Specified with an integer constant, it indicates the number of decimal positions the decimal point is to be moved from its assumed position to the right (if the constant is positive) or to the left (if the constant is negative). *Note:* F is commonly used. (C) 610.5-1990

exponential minus cosine (−cosine) envelope (1) (exponential minus cosine) (of a transient recovery voltage) A voltage-versus-time curve that represents the maximum at any time of the 1 − cosine (1 minus cosine) envelope and the exponential envelope. (SWG/PE) C37.100-1992

(2) (transient recovery voltage) (exponential minus cosine) The greater at any instant of: (A) The curve traced by the multiple exponential, transient voltage across Z when a switch is closed on the circuit shown below. It reaches its crest E_1 at $t = \infty$. (B) The 1-cosine curve with its initial crest at $P.E_1$ represents the alternating current driving or ceiling voltage which is considered at its peak at the time of a current zero and remains practically constant during that portion of the transient defined by the first curve. Hence, it can be considered as a direct current source during this time. The voltage application is simulated by the closing of the switch. e represents the transient voltage across the circuit breaker pole unit. L represents the equivalent effective inductance on the source side of the circuit breaker. Z represents the equivalent surge impedance of associated transmission lines. C represents the equivalent lumped capacitance on the source side of the breaker and modifies the ex-cos envelope by what may be considered as a slight initial time delay, $T_1 \cdot R$ is the transient recovery voltage rate. Besides forming a basis of rating the above definition is also useful in discussing the changes of transient voltage caused by varying the parameters. *Note:* The ex-cos curve is the standard envelope for rating circuit breaker transient recovery voltage performance for circuit breakers rated 121 kV and above.



exponential-cosine envelope

exponential (ex) envelope (of a transient recovery voltage) A voltage-versus-time curve of the general exponential form $e_1 E_1$ [1-ex (t/T)] in which e_1 represents the transient voltage across a switching device pole unit, reaching its crest E_1 at infinite time. *Note:* In practice, this envelope curve is derived from a circuit in which a voltage E_1 charges, by means of a switch, a circuit with inductance L in series with impedance Z and capacitance C in parallel. The voltage of e_1 is measured across Z. E_1 represents the ac driving or ceiling voltage that is considered at its peak at the time of a current zero and remains practically constant during that portion of the transient defined by the first curve. Hence, it can be considered as dc source during this time. The voltage application is simulated by the closing of the switch. e_1 represents the transient voltage across the circuit-breaker pole unit. L represents the equivalent effective inductance on the source side of the circuit breaker. Z represents the equivalent surge impedance of associated transmission lines. C represents the equivalent lumped capacitance on the source side of the breaker and modifies the exponential envelope by what may be considered as a slight initial time delay, T_1. R is the transient recovery voltage rate, corresponding to the initial slope of the exponential envelope. (PE) C37.100-1992

exponential function One of the form $y = ae_{bx}$, where a and b are constants and may be real or complex. An exponential function has the property that its rate of change with respect to the independent variable is proportional to the function, or $dy/dx = by$. (Std100) 270-1966w

exponential horn A horn the cross-sectional area of which increases exponentially with axial distance. *Note:* If S is the area of a plane section normal to the axis of the horn at a distance x from the throat of the horn, S_0 is the area of a plane section normal to the axis of the horn at the throat, and m is a constant that determines the rate of taper or flare of the horn, then

$$S = S_0 e^{mx}$$

(SP) [32]

exponential lag *See:* lag.

exponentially damped sine function A generalized sine function of the form $Ae^{-bx} \sin(x + a)$ where $b > 0$. (Std100) 270-1966w

exponentially weighted moving average (EWMA) algorithm A specific metric algorithm whose behaviour emphasizes recent observation values and that can also, depending upon initialization, transparently pass through the behaviour of the observed gauge or derived gauge type attribute. (LM/C) 802.1F-1993r

exponential reference atmosphere A mathematical model of atmospheric refraction in which the refractivity is approximated by an exponential function of height:

$$N = N_S \exp(-c_e h)$$

where

N = refractivity = $(n - 1) \times 10^6$
n = atmospheric refractive index
N_s = value of N at the surface
h = height in km above the surface

In Bean and Thayer, the exponential coefficient c_e is given by

$$c_e = -\ln\left[1 - \frac{7.32}{N_S}\exp(0.005577 N_S)\right]$$

Note: The average value of N_s in the United States is 313, and the value for a "4/3 earth radius" is 301. (AES) 686-1997

exponential transmission line A tapered transmission line whose characteristic impedance varies exponentially with electrical length along the line. *See also:* waveguide; transmission line. (MTT) 146-1980w

exponent overflow A condition that occurs in floating-point arithmetic if an attempt is made to create an exponent greater than the largest positive number that can be processed or stored. *Synonym:* characteristic overflow. (C) 1084-1986w

exponent spill A condition that occurs in floating-point arithmetic when the exponent of a computed result lies outside the range that can be processed or stored. (C) 1084-1986w

exponent underflow A condition that occurs in floating-point arithmetic if an attempt is made to create a negative exponent greater in absolute value than the smallest nonzero number that can be processed or stored. *Synonym:* characteristic underflow. (C) 1084-1986w

exported catalog Refers to information organized in the exported catalog structure of the standard packaging layout. It is used for distribution catalogs as well as exporting installed software catalogs using `swlist -c` *catalog*. Within software definition files of an exported catalog, all data that can be encoded using IRV, shall be. Any such data that cannot be so encoded shall be transformed using UTF-8. (C/PA) 1387.2-1995

exposed (1) Not isolated or guarded. (T&D/NESC/SUB/PE) C2-1997, 1119-1988w, 1268-1997

(2) (wiring methods) Not concealed. (EEC/PE) [119]

(3) (communication circuits) The circuit is in such a position that in case of failure of supports or insulation, contact with another circuit may result. (NESC) [86]

exposed conductive surfaces (health care facilities) Those surfaces which are capable of carrying electric current and which are unprotected, unenclosed or unguarded, permitting personal contact. Paint, anodizing and similar coatings are not considered suitable insulation, unless they are approved for the purpose. (NESC/NEC) [86]

exposed installation (lightning) An installation in which the apparatus is subject to overvoltages of atmospheric origin. *Note:* Such installations are usually connected to overhead transmission lines either directly or through a short length of cable. *See also:* surge arrester. (PE) [8], [84]

exposed lamp *See:* bare lamp.

exposure (1) (overhead power lines) An expression of the quantity of some material, agent, etc., that is incident on an organism. (T&D/PE) 539-1990

(2) (laser maser) The product of an irradiance and its duration. (LEO) 586-1980w

(3) The subjection of a person to electric, magnetic, or electromagnetic fields or to contact currents other than those originating from physiological processes in the body and other natural phenomena. (NIR) C95.1-1999

(4) (A) (operations) The number of operations during which a component or components within a unit are exposed to failures of response functions. *Note:* For example, the number of commands to open the breaker is the exposure parameter in the case of the circuit breaker failure mode failure to open on command. **(B) (time)** The aggregate time during which a component or components that make up a unit are exposed to failures of continuously required functions. *Note:* Exposure time may include only service time, or it may also include outage time, depending on the type of component or unit and mode of failure. Time is the major measure of exposure for most failure modes (open circuit, short circuit, etc.) of lines and transformers and the switching equipment failure modes "opening without command" and "closing without command." (PE/PSE) 859-1987

exposure fire (Class 1E equipment and circuits) Fire initiated by other than electrical means or supported by fuel other than cable insulation. (PE/NP) 384-1981s

exposure meter A device for measuring the amount of a quantity, to which the device has been exposed, over a period of time. (T&D/PE) 539-1990

exposure time (1) The time during which a component is performing its intended function and is subject to failure. (IA/PSE) 493-1997

(2) The time during which a component is performing its intended function and is subject to failure. Usually expressed in years. (IA) 399-1997

exposure-to-dose-equivalent conversion factor The numerical quantity that relates the exposure (or air kerma) in air to the

dose equivalent at a specified depth in tissue. (NI) N42.20-1995

EXPRESS A standard information modeling language being developed by ISO 10303-11:1994. (ATLAS) 1232-1995

expression (1) An ordered set of one or more characters. (C) 162-1963w, [20]

(2) (mathematics of computing) A sequence of constants, variables, and functions connected by operators to indicate a desired computation. (C) 1084-1986w

Expression-Oriented Language 3 (EOL-3) A programming language used to manipulate strings of characters. (C) 610.13-1993w

expulsion arrester (surge arresters) An arrester that includes an expulsion element. (PE/SPD) C62.1-1981s

expulsion fuse (high-voltage switchgear) A vented fuse or fuse unit in which the expulsion effect of gases produced by the arc and lining of the fuseholder, either alone or aided by a spring, extinguishes the arc. *Synonym:* expulsion fuse unit. (SWG/NESC/PE) C37.100-1992, [86], C37.40-1993

expulsion fuse unit *See:* expulsion fuse.

expulsion-type surge arrester An arrester having an arcing chamber in which the follow-current arc is confined and brought into contact with gas-evolving or other arc-extinguishing material in a manner that results in the limitation of the voltage at the line terminal and the interruption of the follow current. *Note:* The term "expulsion arrester" includes any external series-gap or current-limiting resistor if either or both are used as a part of the complete device as installed for service. (Std100) [84]

exrad *See:* exponent.

exrequisite The specification in a software object such that it shall not be installed if one or more specific software objects are installed. (C/PA) 1387.2-1995

extendability The ease with which a system or component can be modified to increase its storage or functional capacity. *Synonyms:* extensibility; expandability. *See also:* flexibility; maintainability. (C) 610.12-1990

extended acknowledgment *See:* selective acknowledgment.

extended addressing (32-bit) The address model implemented by bus standards supporting 32-bit addresses. The 32-bit extended addressing model is a subset of the 64-bit extended addressing model. (C/MM) 1212-1991s

extended addressing (64-bit) An address model implemented by bus standards supporting 64-bit and 32-bit addresses. The 32-bit extended addressing model is a subset of the 64-bit extended addressing model. (C/MM) 1212-1991s

extended assertion An assertion that is not required to be tested. (C/PA) 1328.2-1993w, 13210-1994, 2003.1-1992, 1328-1993w, 1326.2-1993w

extended back-to-back test A test of a bipolar station in which the transmission terminals of two converters are temporarily jumpered at the remote end of the transmission line. One converter is run as rectifier while the other converter is run as inverter. (PE/SUB) 1378-1997

extended binary coded decimal interchange code (EBCDIC) A binary code in which 256 letters, numbers, and special characters are represented by eight-bit numerals. (C) 1084-1986w

extended binary tree A full binary tree in which all terminal nodes contain data. (C) 610.5-1990w

extended Born approximation The extended Born approximation takes the exciting field to be the incident field after propagating through the average medium. *Synonym:* distorted Born approximation. (AP/PROP) 211-1997

Extended Capabilities Port (ECP) Mode An asynchronous, byte-wide, bidirectional channel. An interlocked handshake replaces the minimum timing requirements of Compatibility Mode. A control line is provided to distinguish between command and data transfers. A command may optionally be used to indicate single-byte data compression or channel address. (C/MM) 1284-1994

extended capability (power operations) The generating capability increment in excess of dependable capability which can be obtained under emergency operating procedures. (PE/PSE) 858-1987s

extended delta connection (power and distribution transformers) A connection similar to a delta, but with a winding extension at each corner of the delta, each of which is 120 degrees apart in phase relationship. *Note:* The connection may be used as an autotransformer to obtain a voltage change or a phase shift, or a combination of both. (PE/TR) C57.12.80-1978r

extended devices A device that has VXIbus configuration registers and a subclass register. This category is intended to allow for definition of additional device types. (C/MM) 1155-1992

extended Huygen's-Fresnel principle An integral relationship between a scalar wave over one plane in an extended random medium and the wave over a parallel plane located a distance away. In this formulation, the random effects are explicitly represented by the change in log amplitude and phase of a spherical wave propagating between the two planes. (AP/PROP) 211-1997

extended interconnect A connection pathway consisting of two or more nets that includes one or more discrete components, where the test requirement is to verify both the integrity of the connections and the values of the components. *Contrast:* simple interconnect. *See also:* discrete component; net. (C/TT) 1149.4-1999

extended longword serial A form of word-serial communication that allows 48-bit data transfers between commanders and servants. (C/MM) 1155-1992

extended option The options that can be specified with the `-x` option. These options may be defined in defaults files or options files. (C/PA) 1387.2-1995

extended memory space An extended address space on a node that provides a RAM-access window for a memory-controller unit architecture. The base address and upper bound of the extended memory space are specified through writes to the node's MEMORY_BASE and MEMORY_BOUND registers. The extended memory space is not relevant to bus standards implementing 64-bit fixed addressing. (C/MM) 1212-1991s

extended packet A version of a command *packet* that is generated by a controller to initiate a directed transaction with a specified slave. (C/MM) 1596.4-1996

extended planned derating (electric generating unit reliability, availability, and productivity) The planned derating that is the extension of the basic planned derating beyond its predetermined duration. (PE/PSE) 762-1987w

extended planned outage (electric generating unit reliability, availability, and productivity) The planned outage state that is the extension of the basic planned outage beyond its predetermined duration. *Note:* Extended planned outage applies only when planned work exceed predetermined duration. The extension, due to a condition discovered during the planned outage, is to be classified as Class 1 unplanned outage (see Class 1 unplanned outage [immediate]). Start-up failure would result in Class 0 unplanned outage (see Class 0 unplanned outage [starting failure]). (PE/PSE) 762-1987w

extended precision *See:* multiple precision.

extended rate set (ERS) The set of data transfer rates supported by a station (if any) beyond the extended service set (ESS) basic rate set. This set may include data transfer rates that will be defined in future physical layer (PHY) standards. (C/LM) 8802-11-1999

extended regular expression A pattern (sequence of characters or symbols) constructed according to the rules defined in IEEE Std 1003.2-1992. (C/PA) 9945-2-1993

extended return to bias (magnetic tape pulse recorders for electricity meters) A method whereby a recording head current, which results in a magnetic field polarity opposite that

of the bias magnet, is applied to the magnetic tape for a portion of the interval in order to record a pulse. (ELM) C12.14-1982r

extended round trip envelope delay The round-trip envelope delay of a network as measured by a small shift in envelope modulation frequency to extend the range of measurement beyond the normal range limit of 1/fmodul. (COM/TA) 743-1995

extended security controls (1) A concept of the underlying system, as follows. The access control mechanisms have been defined to allow implementation-defined extended security controls. These permit an implementation to provide security mechanisms to implement different security policies than those described in POSIX.1. These mechanisms shall not alter or override the defined semantics of any of the functions in POSIX.1. *See also:* appropriate privileges; file access permissions. (C/PA) 9945-2-1993

(2) The access control and privilege mechanisms have been defined to allow implementation-defined extended security controls. These permit an implementation to provide security mechanisms to implement different security policies than described in this part of ISO/IEC 9945. These mechanisms shall not alter or override the defined semantics of any of the functions in this part of ISO/IEC 9945. *See also:* file access permissions; appropriate privileges. (C/PA) 9945-1-1996

extended segment A multiplicity of crate segments accessed by the same group address. Unlike operations on segments linked by segment interconnects, independent operations on each of the segments that are part of an extended segment never proceed concurrently. Depending on the method of implementation, some restrictions may exist as to the placement of masters. Depending on the disposition of modules on the extended segment, some broadcast operations may not be useable or may require special interpretation. (NID) 960-1993

extended service area (ESA) (1) (telephone switching systems) That part of the local service area that is outside of the boundaries of the exchange area of the calling customer. (COM) 312-1977w

(2) The conceptual area within which members of an extended service set (ESS) may communicate. An ESA is larger than or equal to a basic service area (BSA) and may involve several basic service sets (BSSs) in overlapping, disjointed, or both configurations. (C/LM) 8802-11-1999

extended service set (ESS) A set of one or more interconnected basic service sets (BSSs) and integrated local area networks (LANs) that appears as a single BSS to the logical link control layer at any station associated with one of those BSSs. (C/LM) 8802-11-1999

extended source (laser maser) An extended source of radiation can be resolved by the eye into a geometrical image, in contrast to a point source of radiation, which cannot be resolved into a geometrical image. (LEO) 586-1980w

Extended Spanning Tree Protocol The protocol specified in sections 9 and 10 of IEEE Std 802.1G-1995, for optional use among the Remote Bridges of a Group in determining how the Virtual Ports attaching them to the Group are to participate in the active topology. (C/LM) 802.1G-1996

extended superframe format A structure consisting of 24 DS1 frames. The frame overhead bit positions are shared between an extended superframe frame alignment signal, a cyclic redundancy check (CRC), and a data link. (COM/TA) 1007-1991r

extended test A test or collection of tests that shall perform bus transactions and use an external memory buffer. An extended test is invoked by writing to the TEST_START register. (C/MM) 1212-1991s

extended-time rating (grounding device) A rated time in which the period of time is greater than the time required for the temperature rise to become constant but is limited to a specified average number of days operation per year. (PE/SPD) 32-1972r

extended units space An extended address space on a node that provides an access window for unit architectures. The base address and upper bound of the extended units space are specified through writes to the node's UNITS_BASE and UNITS_BOUND registers. The extended units space is not relevant to bus standards implementing 64-bit fixed addressing. (C/MM) 1212-1991s

Extendible Compiler (ETC) An extensible language whose extended language is similar to PL/1. Contains provisions for a programmer to code machine-dependent statements to maximize efficiency. (C) 610.13-1993w

Extendible Computer System Simulator II (ECSS II) An extension of SIMSCRIPT providing statements and data structures for simulating computer hardware configurations, software, and work load. (C) 610.13-1993w

extensibility *See:* extendability.

extensible language A computer language that can be altered or can alter itself to provide a programmer with additional user-specified functions or capabilities. Examples include Ada, ALGOL, FORTH, and LOGO, because each can be used in a building block fashion to construct increasingly complex functions. *See also:* MP; EL1; MADCAP; ETC. (C) 610.13-1993w

extension (1) (Pascal computer programming language) A modification to Section 6 of IEEE 770X3.97-1983 that does not invalidate any program complying with this standard, as defined by Section 5.2, except by prohibiting the use of one or more particular spellings of identifiers. (Std100) 812-1984w

(2) A dialect of a particular language that varies from its referenced standard language such that the extension language has all the capabilities of the referenced language plus some additional capabilities. For example, ALPHA is an extension of PL/1. *Contrast:* subset. (C) 610.13-1993w

extensional set The set containing the currently existing instances of a class. The instances in the extensional set correspond to the database and data modeling notion of *instance*. *Synonym:* current extent. (C/SE) 1320.2-1998

extension bit A bit decoded from the received carrier stream that does not map into the data space but nonetheless denotes the presence of carrier for the purposes of CSMA/CD. (C/LM) 802.3-1998

extension bits One to four bits that are appended to the last octet of a MAC frame to complete the last data quintet.local area networks. (C) 8802-12-1998

extension cord An assembly of a flexible cord with an attachment plug on one end and a cord connector on the other. (EEC/PE) [119]

extension station A telephone station associated with a main station through connection to the same subscriber line and having the same call number designation as the associated main station. *See also:* telephone station. (EEC/PE) [119]

extent (1) (scheme programming language) A period of time, usually referring to the lifetime of an object. Once created, an object with unlimited extent exists forever. (C/MM) 1178-1990r

(2) (data management) A continuous area of storage on a direct access data medium, occupied by or reserved for a particular file. *See also:* secondary space allocation; primary space allocation. (C) 610.5-1990w

external Not associated with the equipment design. (PEL) 1515-2000

external address (subroutines for CAMAC) The symbol *ext* represents an integer that is used an identifier on an external CAMAC address. The address may represent a register that can be read or written, a complete CAMAC address that can be accessed by control or test functions, or a crate address. The value of *ext* is explicitly defined to be an integer. Normally, it can be expected to be an encoded version of the address components, in which the coding has been selected for the most efficient execution of CAMAC actions on the interface to which the implementation applies. Other possi-

bilities are allowed, however. For example, *ext* may be an index or a point into a data structure in which the actual CAMAC address components are stored. (NPS) 758-1979r

external addresses (subroutines for CAMAC) The symbol *extb* represents an array of integers containing external CAMAC addresses. The array has two elements: (1) The starting address for an Address Scan multiple action; (2) The final address that can be permitted to participate in the Address Scan sequence. Each element has the same form and information content as the parameter *ext*. *See also:* external address. (NPS) 758-1979r

external audit (nuclear power quality assurance) An audit of those portions of another organization's quality assurance program not under the direct control or within the organizational structure of the auditing organization. (PE/NP) [124]

external capacitor fuse A fuse external to, and in series with, a capacitor unit or group of units. (SWG/PE) C37.40b-1996

external chaining *See:* separate chaining.

external connector (aerial lug) A connector that joins the external conductor to the current-carrying parts of a cable termination. (PE/IC) 48-1996

external data file (A) A data file that is sorted on an external storage medium such as a magnetic tape. **(B)** A data file that is stored apart from the system using the data. (C) 610.5-1990

external data model A data model depicting entities within a specific application or type of application in an organization. *Contrast:* internal model. (C) 610.5-1990w

external data submodel *See:* external schema.

external dc short circuit (thyristor power converter) A short circuit on the dc side outside the converter. *Note:* External short circuits may require different protecting means, depending on the character of the short circuit. Complete dc short circuit occurs when the short-circuit impedance is negligible compared to internal impedance of the converter. Limited dc short circuit occurs when the short-circuit impedance is large enough to limit the fault current. Feeder dc short circuit is a short circuit in a feeder with a separate protective device with much lower rating than the feeding converter (multimotor drives). (IA/IPC) 444-1973w

external device (A) A unit of processing equipment in a computer system external to the central processing unit. **(B)** In a personal computer, a device that is not physically contained within the main cabinet. *Note:* Examples include external disk drives and external modems. (C) 610.10-1994

external entry search *See:* interpolation search.

external environment A set of entities external to the application platform with which services are provided. External entities include people, exchangeable media that is not mounted in the platform, communication wiring, and other platforms. (C/PA) 14252-1996

external environment interface (EEI) The interface between the application platform and the external environment across which services are provided. The EEI is defined primarily in support of systems and application interoperability. The primary services present at the EEI are

— Human/computer interface
— Information
— Communications

(C/PA) 1003.23-1998, 14252-1996

external field influence (electric instruments) The percentage change (of full-scale value) in indication caused solely by a specified external field. Such a field is produced by a standard method with a current of the same kind and frequency as that which actuates the mechanism. This influence is determined with the most unfavorable phase and position of the field in relation to the instrument. *Note:* The coil used in the standard method shall be approximately 40 inches in diameter not over 5 inches long, and carrying sufficient current to produce the required field. The current to produce a field to an accuracy of ±1 percent in air shall be calculated without the instrument in terms of the specific dimensions and turns of the coil. In this coil, 400 ampere-turns will produce a field of approximately 5 oersteds. The instrument under test shall be placed in the center of the coil. *See also:* accuracy rating. (EEC/ERI/AII) [111], [102]

external insulation (1) (surge arresters) (power and distribution transformers) (apparatus) The external insulating surfaces and the surrounding air. *Note:* The dielectric strength of external insulation is dependent on atmospheric conditions. (SWG/PE/TR) C57.12.80-1978r, [8]

(2) The air insulation and the exposed surfaces of solid insulation of equipment, which are both subject to dielectric stresses and to the effects of atmospheric and other external conditions such as contamination, humidity, vermin, etc. (C/PE/PSIM) 1313.1-1996, 4-1995

(3) Insulation that is designed for use outside of buildings and for exposure to the weather. (SWG/PE) C37.100-1992

external label (1) A label, usually not machine-readable, attached to a data medium container; for example, a paper sticker attached to the outside of a reel of magnetic tape. *Contrast:* internal label. (C) 610.5-1990w, 610.10-1994w

(2) A marking on the exterior of a cartridge that identifies it. The external label may be human-readable, machine-readable, or both. A bar-code label is an example of an external label. (C/SS) 1244.1-2000

external line fault A fault that occurs on lines or equipment other than the transmission line that includes the series capacitor installation. (T&D/PE) 824-1994

external logic state A logic state assumed to exist outside a symbol outline, either on an input line prior to any external qualifying symbol at that input, or on an output line beyond any external qualifying symbol at that output. (GSD) 91-1984r

external loss time *See:* environmental loss time.

externally commutated converter (self-commutated converters) A converter in which the commutating voltages are supplied by the ac supply lines, the ac load, or some other ac source outside the converter. (IA/SPC/ID) 936-1987w, 995-1987w

externally commutated inverters An inverter in which the means of commutation is not included within the power inverter. *See also:* self-commutated inverters. (IA) [62]

externally operable Capable of being operated without exposing the operator to contact with live parts. (NESC/NEC) [86]

externally programmed automatic test equipment (test, measurement, and diagnostic equipment) An automatic tester using any programming technique in which the programming instructions are not read directly from within the ATE (automatic test equipment), but from a medium which is added to the equipment such as punched tape, punched cards, and magnetic tape. (MIL) [2]

externally quenched counter tube A radiation counter tube that requires the use of an external quenching circuit to inhibit reignition. (ED) [45]

externally ventilated machine (rotating machinery) A machine that is ventilated by means of a separate motor-driven blower. The blower is usually mounted on the machine enclosure but may be separately mounted on the foundation for large machines. *See also:* separately ventilated machine; open pipe-ventilated machine. (PE) [9]

externally visible Actions or values that can be seen by other Units, as opposed to those that are unit-private. Externally visible conditions are specified by this document, unit-private conditions are not. (C/MM) 1212.1-1993

external merge sort A merge sort that makes use of auxiliary storage. *Contrast:* internal merge sort. *See also:* balanced merge sort; tape merge sort; unbalanced merge sort; direct-access merge sort; multiway merge sort. (C) 610.5-1990w

external node *See:* terminal node.

external record A record within an external view. (C) 610.5-1990w

external remanent residual voltage (Hall effect devices) That portion of the zero field residual voltage which is due to remanent magnetic flux density in the external electromagnetic core. (MAG) 296-1969w

external schema (A) A description of the format, layout, and contents of the data, within a database, to be employed by a user or application program. *Note:* The schema is written using the data definition portion of the data sublanguage. *Synonyms:* data submodel; logical view. *Contrast:* conceptual schema. *See also:* internal schema. **(B)** A logical description of an organization or enterprise. *Note:* The external schema may differ from the conceptual schema in that some entities, attributes, or relationships may be omitted, renamed, or otherwise transformed. **(C)** A description of the user's view of data. *Synonym:* external data submodel; view; subschema. (C) 610.5-1990

external series gap (expulsion-type arrester) An intentional gap between spaced electrodes, in series with the gap or gaps in the arcing chamber. (PE) [8], [84]

external sort A sort that requires the use of auxiliary storage. *Contrast:* internal sort. (C) 610.5-1990w

external storage (test, measurement, and diagnostic equipment) Information storage off-line in media such as magnetic tape, punched tape, and punched cards. (MIL) [2]

external stress An aging stress that is derived from the environment to which insulation is exposed, such as temperature, gas composition, or radiation. (DEI/RE) 775-1993w

external system interfaces The system or product interfaces to other systems, platforms, or products that influence the design solutions for consumer products and their life-cycle processes. (C/SE) 1220-1994s

external temperature influence (direct-current instrument shunts) The percentage change in the output voltage of a shunt (expressed in terms of rated output and measured with low current) when the ambient temperature is changed from 25°C to 100°C. (PE/PSIM) 316-1971w

external termination (*j*th terminal of an *n*-terminal network) The passive or active two-terminal network that is attached externally between the *j* th terminal and the reference point. *See also:* electron-tube admittances. (ED/ED) 161-1971w, [45]

external test (EXTEST) A defined instruction for the test logic defined by 1149.1-1990. (TT/C) 1149.1-1990

external timing source function The function of providing the primary point of synchronization of the DQDB subnetwork to some external timing reference, for example, that provided by a public network operator. (LM/C) 8802-6-1994

external trigger (oscilloscopes) A triggering signal introduced into the trigger circuit from an external source. (IM) 311-1970w

external variable *See:* exogenous variable.

external view The format, layout, and contents of the data in a database that a user or application program uses, as described in an external schema. *Contrast:* conceptual schema. *See also:* external record. (C) 610.5-1990w

EXTEST *See:* external test.

extinction The decrease of power flux density of an electromagnetic wave due to absorption and scattering. (AP/PROP) 211-1997

extinction coefficient (κ_e) (of a medium) The rate of decrease of power density of a wave, per unit distance, due to absorption and scattering. (AP/PROP) 211-1997

extinction cross-section (σ_e) (of a body) The ratio of power absorbed (P_a) and scattered (P_s) by the body to the power density of an incident plane wave, S_i:

$$\sigma_e = \frac{(P_a + P_s)}{S_i} = \sigma_a + \sigma_{ts}$$

where

σ_a = the absorption cross-section of the body

σ_{ts} = the total scattering cross-section of the body

(AP/PROP) 211-1997

extinction matrix ($\kappa = _e$) (of a medium) Vector analog of extinction coefficient for polarized waves propagating in an anisotropic medium. (AP/PROP) 211-1997

Extinction Ratio The ratio of the low optical power level to the high optical power level on an optical segment. (C/LM) 802.3-1998

extinction voltage (gas tube) The anode voltage at which the discharge ceases when the supply voltage is decreasing. (ED) [45], [84]

extinguishing voltage (drop-out voltage) (glow lamp) Dependent upon the impedance in series with the lamp, the voltage across the lamp at which an abrupt decrease in current between operating electrodes occurs and is accompanied by the disappearance of the negative glow. *Note:* In recording or specifying extinguishing voltage, the impedance must be specified. (EEC/EL) [104]

extraband spurious transmitter output (land-mobile communications transmitters) Spurious output of a transmitter outside of its specified band of transmission. (EMC) 377-1980r

extracameral (radiation protection) (radiological monitoring instrumentation) Pertaining to that portion of the instrument exclusive of the detector. (NI) N320-1979r, N323-1978r

extracameral effect (monitoring radioactivity in effluents) Apparent response of an instrument caused by radiation on any other portion of the system than the detector. (NI) N42.18-1980r

extracameral response (plutonium monitoring) An instrument response arising from the action of the radiation field on parts of the instrument other than the intended radiosensitive element. (NI) N317-1980r

extract (A) (electronic computation) To form a new word by juxtaposing selected segments of given words. **(B)** To pick, from a set of items, all items that meet a particular criterion. *See also:* select; database extract. (Std100/C) 270-1966, 610.5-1990

extraction indexing *See:* derivative indexing.

extract instruction (1) (electronic digital computation) An instruction that requests the formation of a new expression from selected parts of given expressions. (C) 162-1963w, [20], [85]

(2) An instruction that creates a new data item from parts of one or more other data items. (C) 610.10-1994w

extraction liquor The solvent used in hydrometallurgical processes for extraction of the desired constituents from ores or other products. *See also:* electrowinning. (EEC/PE) [119]

extragalactic radio waves Radio waves from beyond our galaxy. *See also:* cosmic noise. (AP/PROP) 211-1997

extra-high voltage (EHV) (1) (power operations) A term applied to voltage levels that are higher than 230 000 V. (PE/PSE) 858-1987s

(2) A term applied to voltage levels that are greater than 240 000 V. (PE/T&D) 516-1995

extra-high voltage aluminum-sheathed power cable (aluminum sheaths for power cables) Cable used in an electric system having a maximum phase-to-phase rms ac voltage above 242 000 V, the cable having an aluminum sheath as a major component in its construction. (PE/IC) 635-1989r

extra-high-voltage system (electric power) An electric system having a maximum root-mean-square alternating-current voltage above 240 000 volts to 800 000 volts. *See also:* low-voltage system; medium-voltage system; high-voltage system. (IA/PSE) 570-1975w

extranet A set of intranets connected for specific objectives. (C) 2001-1999

extraordinary load (composite insulators) The ice or wind load, or both, that may last for as long as one week, recurring as often as once per year. (T&D/PE) 987-1985w

extraordinary wave The magneto-ionic wave component in which the electric vector rotates in the opposite sense to that for the ordinary wave component. *Synonym:* X wave. *See also:* ordinary wave. (AP/PROP) 211-1997

extrapolated failure rate Extension by a defined extrapolation or interpolation of the observed or assessed failure rate for durations and/or conditions different from those applying to the observed or assessed failure rate. *Note:* The validity of the extrapolation shall be justified. (R) [29]

extrapolated mean life (non-repaired items) Extension by a defined extrapolation or interpolation of the observed or assessed mean life for stress conditions different from those applying in the observed or assessed mean life. *Note:* The validity of the extrapolation shall be justified. (R) [29]

extrapolated range for electrons (solar cells) The distance of travel in a material by electrons of a given energy, at which the flux of primary electrons extrapolates to zero. (AES/SS) 307-1969w

extrapolated reliability Extension by a defined extrapolation or interpolation of the observed or assessed reliability for durations and/or conditions different from those applying to the observed or assessed reliability. *Note:* The validity of the extrapolation shall be justified. (R) [29]

extra work (extras) Work performed by the contractor that has to be added to the contract for unforeseen conditions or changes in the scope of work. (IA/PSE) 241-1990r

extreme environment One in which ambient temperature or humidity or both fall outside a specified range of values. (NI) N42.17B-1989r

extreme load (composite insulators) The greatest load to occur on the line in a 50-year period. It may last as long as one day. (T&D/PE) 987-1985w

extremely low frequency (ELF) 3 Hz to 3 kHz. *See also:* radio spectrum. (AP/PROP) 211-1997

extreme low frequency range Frequency range from 3 Hz to 3 kHz. (T&D/PE) 539-1990

extremely high frequency (EHF) 30–300 GHz. *See also:* radio spectrum. (AP/PROP) 211-1997

extreme operating conditions (automatic null-balancing electric instrument) The range of operating conditions within which a device is designed to operate and under which operating influences are usually stated. *See also:* measurement system. (EEC/EMI) [112]

extreme value engineering (EVE) *See:* traffic engineering limits.

extreme value traffic measures Modern data collection systems that can collect and process large amounts of data have made it possible to observe an entire year's traffic data and then to engineer on only a subset of this (e.g., THDBH and HDBH). Though engineering on the peak data alone provides greater protection from overloads, peak data can be very volatile since it is based on only a small number of observations. Statistically based estimates of peak traffic hours can replace single busy-hour observations, in order to reduce volatility of peak estimates. These estimates reduce the risk of overengineering on the basis of outlying data. These methods applied to PTS are called EV methods because they provide estimates of "extreme" traffic loads, such as HDBH and THDBH, that are more accurate than observations of actual traffic. These estimates are more accurate because they are based on a large amount of the busy season's daily peak data, rather than only the highest day or 10 highest days of the year. Further advances in data collection systems have made it possible to observe the entire day's data for every day of the busy season, not just the busy hour. The newer systems can automatically pick out the single hour of data when the office is busiest. (COM/TA) 973-1990w

extrinsic joint loss (fiber optics) That portion of joint loss that is not intrinsic to the fibers (that is, loss caused by imperfect jointing). *See also:* gap loss; angular misalignment loss; intrinsic joint loss; lateral offset loss. (Std100) 812-1984w

extrinsic properties (semiconductor) The properties of a semiconductor as modified by impurities or imperfections within the crystal. *See also:* semiconductor; semiconductor device. (ED) 216-1960w

extrinsic semiconductor (1) A semiconductor whose charge-carrier concentration is dependent upon impurities. *See also:* semiconductor. (IA/ED) 59-1962w, 216-1960w, [12]
(2) (power semiconductor) A semiconductor in which the concentrations of holes and electrons are unbalanced by the introduction of impurities. (PE/EDPG) [93]

extruded A joint in which both cables are insulated with extruded dielectrics. The dielectrics may or may not be of the same material type. (PE/IC) 404-1993

eye bolt (rotating machinery) A bolt with a looped head used to engage a lifting hook. (PE) [9]

eyelet A hollow tube inserted in a printed circuit or terminal board to provide electric connection or mechanical support for component leads. *See also:* soldered joints. (EEC/AWM) [105]

eye light (illuminating engineering) Illumination on a person to provide a specular reflection from the eyes (and teeth) without adding a significant increase in light on the subject. (EEC/IE) [126]

eye-opening penalty The difference, in dB, between (a) the optical power measured at the center of the data eye, and (b) the optical power measured at a point defined by the total worst-case peak-to-peak jitter at the receiver. (C/LM) 802.3-1998

eye pattern (data transmission) An oscilloscope display of the detector voltage waveform in a data modem. This pattern gives a convenient representation of cross-over distortion that is indicated by a closing of the center of the eye. (PE) 599-1985w